

a revision of the south african
species of

gladiolus



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G. J. LEWIS
A. A. OBERMEYER
WITH
T. T. BARNARD

This is the first book to be published on the South African species of *Gladiolus* and contains descriptions of 103 species, including many new to science. It is lavishly illustrated and should prove of great interest to those thousands of people all over the world who know and cultivate these beautiful flowers.

Three authors have collaborated in the compilation of this book—Dr G. Joyce Lewis, A. Amelia Obermeyer and Dr T. T. Barnard. It contains a fund of information for both the botanist and the horticulturist and includes, in addition to the scientific descriptions of the species, notes on hybrids and the story of the evolution of the best-known hybrids now used so extensively by horticulturists the world over.

It contains 32 illustrations in full colour—the work of talented artists, well known in this field of art—as well as 51 half-tone plates and 30 black and white figures, all of which enhance the value and beauty of this eminently desirable book.

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GLADIOLUS: A REVISION OF THE SOUTH AFRICAN SPECIES



GWENDOLINE JOYCE LEWIS (1909–1967).

JOURNAL OF
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GLADIOLUS

A REVISION OF THE SOUTH AFRICAN SPECIES

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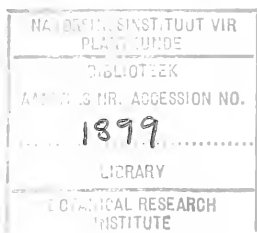
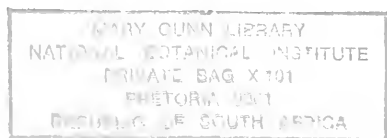
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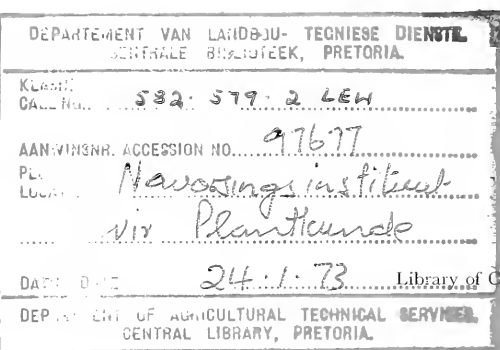
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Foreword

'I am persuaded that the African Gladioli will become great favourites with florists when their beauty in the open border, the facility of their culture and the endless variety which may be produced from seed by blending the several species are fully known, nor will they be found to yield in beauty to the Tulip and Ranunculus.'

WILLIAM HERBERT 1820 (*Trans. Hort. Soc., London* 4 : 154. 1822).

No genus of South African plants has contributed more to world horticulture than the genus *Gladiolus*. When Dean Herbert made his prophecy he was thinking only of the numerous hybrids he had raised between the Cape species and their value as early summer border plants and as cut flowers. Although he lived long enough to see the introduction of the first summer-growing species and the first hybrids that were the foundation of the modern garden Gladioli, he could hardly have foreseen the contribution that the genus was to make, in the thousands of varieties that are now available and the millions of corms that are marketed annually throughout the world today. Yet only a handful of the 103 species described in this volume have been utilized to achieve this result. Many of the commoner species have been neglected by cultivators and the rarer ones overlooked by collectors. It is a measure of how little was known until recently that no less than 20 new species are described in this book, three of which were collected for the first time during its preparation.

No review of the genus had been attempted since Baker's account in the *Flora Capensis* more than seventy years ago. Some of Baker's errors had been from time to time corrected and several new species had been described. A revision of the South African species was long overdue. It was therefore a great pleasure to me when Joyce Lewis, having finished her work on *Ixia*, agreed to undertake the revision of *Gladiolus*. The project necessitated a second visit to the main herbaria of Europe and the cultivation at Kirstenbosch of as many species as possible. Her sudden and tragic death with her work unfinished might have postponed the revision indefinitely. However, I immediately approached Mrs Mauve (A. Amelia Obermeyer) of the Botanical Research Institute, Pretoria and I am most grateful to her for so readily agreeing to undertake the very difficult task of revising and completing the work that Joyce Lewis had begun. How well she has accomplished this I can confidently leave to be judged by those many readers who will, I know, enjoy and profit from this authoritative account of a most fascinating group of plants.

The cost of publication of this volume with its numerous illustrations has been met by a grant from the Fourcade Bequest to the University of Cape Town, supplemented by a further grant from the Trustees of the National

Botanic Gardens of South Africa and by a generous donation from the late Mrs G. Lewis and members of the Lewis family, to whom I extend my sincerest thanks.

I should like also to thank Dr Codd, Director of the Botanical Research Institute, Pretoria and the Department of Agricultural Technical Services, for permission to reproduce illustrations published in or commissioned for the *Flowering Plants of Africa* and for permitting Mrs Mauve to undertake this work.

Dr T. T. Barnard has co-operated in this work since its commencement and his knowledge of the Cape species and his experience in growing so many of them in England have been of great value to both authors. He and Mrs C. E. Hugo, formerly librarian to the National Botanic Gardens, have together prepared the manuscript for the press. To both of them also my sincere thanks are due.

H. B. Rycroft.

Editor.

Gwendoline Joyce Lewis

Gwendoline Joyce Lewis was interested in flowers from her earliest days and made it her life-work. She was born in Cape Town on 27 March 1909 and was educated there except for a brief spell at a finishing school in England. She obtained her B.A. from the University of Cape Town in 1932. The E. M. Solly scholarship was awarded to her at Kirstenbosch for 1932–3 and during this time she described her first ‘new’ species, *Gladiolus barnardii* from Rhodesia and *Gladiolus retrocurvus* from the Transvaal. The former she named after Dr T. T. Barnard, who even in those days had already succumbed to the lure of the South African Iridaceae, a family so richly represented in the Cape with a variety of attractive and unusual flowers but presenting a formidable challenge to the taxonomist. Joyce, too, came under its spell and in time was regarded as a specialist on this family.

From 1 February 1936 to the end of January 1938 she was on the staff of the Bolus Herbarium and then became the Curator of the Herbarium of the South African Museum, a post she held for 18 years with an interruption during the Second World War when she served in the Transport Section. In 1952 she gained her Ph.D. degree from the University of Cape Town for her thesis entitled ‘Some aspects on the morphology, phylogeny and taxonomy of the South African Iridaceae’.

When the Museum Herbarium was transferred to the Compton Herbarium at Kirstenbosch in 1956 she was given the post of Botanical Research Officer, and there she remained until her untimely death from heart failure on 11 April 1967.

During her lifetime she regularly published her researches on the various Iridaceous genera, mainly in the *Annals of the South African Museum* and *Journal of South African Botany*, and from time to time her water-colour plates of new or interesting Iridaceae appeared in the *Flowering Plants of Africa* series. She collaborated with Adamson & Salter in the *Flora of the Cape Peninsula* (1950), dealing with the families Iridaceae and Orchidaceae.

She established the genera *Engysiphon*, *Tritoniopsis* and *Thereianthus* to be followed later by revisions of *Babiana* and *Ixia*. She always lavishly illustrated her works. But it was the genus *Gladiolus* she chose as her *magnum opus*, a revision of the Bells, Pypies, Kalkoentjies and Aandblomme, the flowers she had come to know so well during all these years. She collected them, cultivated them, described and painted them and she travelled to the European herbaria to compare them with old type specimens, some preserved there for more than 200 years. From a study of these old specimens, descriptions and often beautiful illustrations in old books, Joyce could assign to her Cape plants their correct names. As a result of this research her last publication once more dealt with *Gladiolus*, four name changes of well-known Cape species.

At the time of her death she left behind 47 plates of *Gladiolus* species; some of

these portrayed new species, many were rare. She had completed the text for 124 taxa leaving a small number unfinished. Unfortunately she left no notes or keys. During my subsequent studies of the genus the recurring pattern of the variability of the perianth (long or short tubes and lobes, colour variation, size, etc.) made me realize that these characters were unstable and should not be used solely to differentiate the species. As a result a number of species were reduced to subspecies or varieties or suppressed altogether. To conform with more modern ideas of presentation, the 'set-up' of each species, which was similar to the one Lewis used for *Babiana* and *Ixia*, was changed. In most cases her descriptions of the plants, which she knew so well, were left as they were, except where a broader concept demanded slight amendments. Many of the historical and general notes at the end of each species were drawn up by Lewis.

It was her intention to exclude the genus *Homoglossum* although so closely related. Goldblatt in his recent work shares this viewpoint. The controversial species *Gladiolus aureus* has here been removed to the genus *Homoglossum*.

The new species she had described bear her name as author; where I effected changes in the species concept my name appears. I am also responsible for the description of *G. stefaniae*, *G. macneilii* and *G. vernus* while *G. vigilans* has been described by Dr T. T. Barnard.

A. A. Obermeyer-Mauve
Botanical Research Institute, Pretoria

LIST OF PUBLICATIONS BY G. JOYCE LEWIS

- 1931 *S. Afr. Gdng Ctry Life* **21** : 369. *Ixia rouxii* Lewis.
- 1932 *S. Afr. Gdng Ctry Life* **22** : 204, 205, 243, 253. *Gladiolus barnardii* Lewis; *Gladiolus retrocurvus* Lewis; *Babiana longibracteata* Lewis; *Babiana lata* Lewis.
- 1933 *S. Afr. Gdng Ctry Life* **23** : 140, 167–168, 213, 255, 256, 266. *Gladiolus triangulus* Lewis; *Moraea incurva* Lewis; *Ixia paucifolia* Lewis; *Acidanthera roseo-alba* Lewis; *Hesperantha flava* Lewis; *Homeria tricolor* Lewis.
- 1934a *Flower. Pl. S. Afr.* **14** : t. 541, 542, 543, 544, 545, 546, 547, 548, 549, 550. *Dierama longiflorum* Lewis; *Dierama grandiflorum* Lewis; *Ixia trifolia* Lewis; *Romulea atrandra* Lewis; *Babiana subglabra* Lewis; *Babiana brachystachys* (Bak.) Lewis; *Syringodea filifolia* Bak.; *Nivenia concinna* N.E. Br.; *Hebea dodii* Lewis; *Gladiolus triangulus* Lewis.
- 1934b *S. Afr. Gdng Ctry Life* **24** : 268. *Babiana fourcadei* Lewis.
- 1935 *S. Afr. Gdng Ctry Life* **25** : 57. *Gladiolus pillansii* Lewis.
- 1938a *Jl S. Afr. Bot.* **4** : 1–11. Eight New Iridaceae from the Cape Province. *Babiana adpressa* Lewis; *B. crispa* Lewis; *B. erectifolia* Lewis; *Galaxia citrina* Lewis; *G. variabilis* Lewis; *Romulea aquatica* Lewis; *Ixia splendida* Lewis; *Ixia bolusii* Lewis. A new Orchid, *Holothrix longicornu* Lewis, 53, t. 11 B.
- 1938b *Flower. Pl. S. Afr.* **18**, t. 682, 685, 686, 689. *Hesperantha pauciflora* (Bak.) Lewis; *Babiana cuneifolia* Bak.; *Babiana spiralis* Bak.; *Watsonia alpina* Lewis.
- 1939 *Flower. Pl. S. Afr.* **19**, t. 726, 741, 742, 743, 744, 746, 747. *Watsonia bulbifera* Mathews & L. Bolus; *W. longifolia* Mathews & L. Bolus; *W. wordsworthiana* Mathews & L. Bolus; *W. wilmaniae* Mathews & L. Bolus; *W. beatricis* Mathews & L. Bolus; *W. knysnana* L. Bolus; *versfeldii* Mathews & L. Bolus.
- 1941 *Jl S. Afr. Bot.* **7**. Iridaceae. New Genera and Species and Miscellaneous Notes 19–59: I. *Engysiphon* Lewis gen. nov.; II. Revision of Species placed under *Acidanthera* by Baker in *Fl. Cap.* **6** and published since then. III. The New Genus *Thereianthus* Lewis gen. nov. IV. Various New Species of Iridaceae (*Romulea longituba* Lewis; *Galaxia albiflora* Lewis; *Geissorhiza*

- umbrosa* Lewis; *Geissorhiza teretifolia* Lewis; *Bobartia paniculata* Lewis; *Bobartia gladiata* Ker var. *major* Lewis; *B. indica* L. var. *minor* Lewis; *Klattia partita* Bak. var. *flava* Lewis; *Moraea odorata* Lewis; *Moraea tripetala* Ker var. *jacquiniana* Schltr. ex Lewis). V. Miscellaneous Notes on Iridaceae. VI. The Identity of *Tulipa breyniana* L. Plantae Novae Africanae series 16. *Disa salteri* Lewis 78–80.
- 1945 *Jl S. Afr. Bot.* **11**; Plantae Novae Africanae series 24 : 108–112, 117–118. *Bobartia lilacina* Lewis; *Homeria bulbiflora* Lewis.
- 1945–6 *Flower. Pl. S. Afr.* **25**, t. 968, 969, 994. *Ixia polystachya* L.; *Ixia cochlearis* Lewis; *Gladiolus nerineoides* Lewis.
- 1947 *Flower. Pl. Afr.* **26**, t. 1004, 1006. *Gladiolus stokoei* Lewis; *Scilla plumbea* Lindl.
- 1948 *Jl S. Afr. Bot.* **14**. Plantae Novae Africanae series 28 : 31, t. 2, 34. *Monadenia ecalcarata* Lewis; *Watsonia tabularis* Mathews & L. Bolus var. *concolor* Lewis; *Homoglossum merianellum* (L.) Bak. var. *aureum* Lewis. Some changes in Nomenclature V : 85–89. *Herschelia lacera* (Swartz) Lewis; *Gladiolus monticola* Lewis; *Homeria umbellata* (Thunb.) Lewis; *Moraea tricuspidata* (L.f.) Lewis; *Moraea confusa* Lewis.
- 1949 *Jl S. Afr. Bot.* **15**. Plantae Novae Africanae, series 29 : 37; *Moraea papilionacea* (L.f.) Ker var. *maythamiae* Lewis. *Moraea angusta* and Allied Species, 115–120 (1949). *Moraea angusta* (Thunb.) Ker; *M. neglecta* Lewis; *M. anomala* Lewis.
- 1950 *Flora of the Cape Peninsula* by Adamson & Salter; The Iridaceae and the Orchidaceae.
- 1950–1 *Flower. Pl. Afr.* **28**, t. 1083, 1084, 1109. *Aristea coerulea* (Thunb.) Vahl; *Aristea macrocarpa* Lewis; *Plectranthus behrii* Compton.
- 1952a *Flower. Pl. Afr.* **29** t. 1158, 1159, 1160. *Gladiolus subcaeruleus* Lewis; *Gladiolus pillansii* Lewis var. *roseus* Lewis; *Gladiolus prismatosiphon* Schltr.
- 1952b *Ann. S. Afr. Mus.* **40** : 1–5. A note on the Rediscovery of Thunberg's '*Gladiolus flexuosus*' and a complete description of the plant. Plantae Novae Africanae 6–14. *Neopatersonia namaquensis* Lewis; *Urginea multifolia* Lewis; *Lapeirousia effurcata* Lewis; *Ixia stolonifera* Lewis.
- 1954 *Ann. S. Afr. Mus.* **40**. Some aspects of the Morphology, Phylogeny and Taxonomy of the South African Iridaceae 15–113. Miscellaneous Notes, 115–135. *Moraea macronyx* Lewis; *Ferraria foliosa* Lewis; *Ferraria brevifolia* Lewis; *Ixia leipoldtii* Lewis; *Gladiolus symmetranthus* Lewis; *G. jonquilodoros* Eckl. ex Lewis; *G. brevifolius* Bak. var. *robustus* Lewis; *G. meridionalis* Lewis; a note on *G. caryophyllaceus* (Burm. f.) Poir.; *G. pubigerus* Lewis.
- 1956 *Ann. S. Afr. Mus.* **40** : 137–151. A Revision of the Genus *Synnotia* Sweet.
- 1959a *Jl S. Afr. Bot.* **25**. South African Iridaceae. A Revision of *Hexaglottis* Vent. 215–230. The genus *Tritoniopsis* L. Bol. 319–355. The genus *Babiana* Ker, Suppl. 3.
- 1959b *Flower. Pl. Afr.* **33**, t. 1316, *Ferraria undulata* L.
- 1960 *Jl S. Afr. Bot.* **26** : 51–72, The Genus *Anapalina* N.E. Br.
- 1962 *Jl S. Afr. Bot.* **28** : 45–195, The Genus *Ixia* L.
- 1963 *Lantern* **13** : 31–39. Bulbous Plants—South Africa's Contribution to World Horticulture in Bulbous Plants.
- 1966 *Bot. Notiser* **119** : 286–296 (1966). Thunberg's South African Species of *Gladiolus*—four name changes. *Gladiolus bullatus* Thunb. ex Lewis; *G. liliaceus* Houtt.; *G. punctulatus* Schrank; *G. stellatus* Lewis.

Acknowledgements

In July 1967 I was asked by the Director of the National Botanical Gardens of South Africa, Prof. H. B. Rycroft at Kirstenbosch, if it were possible for me to complete the unfinished *Gladiolus* manuscript of the late Dr G. J. Lewis. This was willingly undertaken and I should like to thank Dr L. E. Codd, Director of the Botanical Research Institute, Pretoria for his kind co-operation in this matter.

In completing this work I found the co-operation of colleagues and enthusiastic amateurs, too numerous to mention, invaluable and I thank them most sincerely. To Miss W. F. Barker of the Compton Herbarium I am particularly grateful for her unstinted assistance in every possible way with the Lewis manuscripts, in putting the Compton Herbarium at my disposal and photographing flowering material. Dr Peter Goldblatt, with whom I discussed taxonomical problems and who discovered the interesting new species *Gladiolus lapeirousioides*, is also most cordially thanked, and so are Mr J. W. Loubser, the hardworking secretary of the Indigenous Bulb-growers Association, who found time to write on the behaviour of species in cultivation, Mr P. G. McNeil, who led us to the lovely new species now bearing his name, and Mr N. J. Devenish, who showed us the rare *G. appendiculatus* growing on his farm Oshoek near Wakkerstroom. The Directors and staff of the Herbaria of Geneva, Kew, Leiden, Lund and Zürich are thanked for their courtesy in lending us specimens and presenting us with photographs of type specimens. Last but not least it was a real pleasure to have the full co-operation of Dr T. T. Barnard, who has been interested in the Iridaceae for very many years and who was so successful in the cultivation and hybridization of scented Cape species of *Gladiolus* in England. His chapter on the history and on the cultivated hybrids will no doubt interest many botanists.

Our knowledge of the genus is still very inadequate but we hope the unsolved problems will stimulate others to do further research on this attractive and popular genus.

A. A. Obermeyer

GLADIOLUS: A REVISION OF THE SOUTH AFRICAN SPECIES

ABSTRACT

A taxonomic revision of the genus *Gladiolus* (Iridaceae) in southern Africa is presented; 103 species are recognized, of these 20 are new to science, 3 are new subspecies and 11 new varieties, while 21 taxa, described as species, are reduced to infra-specific rank; 3 species receive new names as their names were later homonyms; 1 species is removed from another genus to *Gladiolus* and 1 species is returned to this genus. One species is removed from *Gladiolus* and placed in the genus *Homoglossum*.

The genus is divided into 4 loose groups; keys are provided to the groups and species; morphological characters are discussed such as reduction of leaves and plasticity of perianth.

Historical notes are given and a short history of the cultivated hybrids. The main part of the work is devoted to a description of each species, listing of synonyms, recording their distribution and additional historical notes relating to some of the old species.

There is a short life history of the late G. Joyce Lewis and a list of her publications.

UITTREKSEL

GLADIOLUS: 'N HERSIENING VAN DIE SUID-AFRIKAANSE SOORTE

'n Taksonomiese hersiening van die geslag *Gladiolus* (Iridaceae) in suidelike Afrika is opgestel; 103 soorte word in stand gehou; van hierdie is 20 nuut vir die wetenskap; daar is 3 nuwe subspesies, 11 nuwe variëteite terwyl 21 taksa as soorte beskryf, nou infraspesifieke rang gegee is; 3 soorte ontvang nuwe name aangesien hulle huidige name homonieme is; 1 soort is uit 'n ander geslag weggeneem en in *Gladiolus* geplaas terwyl 1 soort weer teruggebring is na *Gladiolus*. Een soort is verwyder en in *Homoglossum* geplaas.

Die geslag is in 4 los groepe verdeel; sleutels vir die soorte is opgestel; morfologiese kenmerke word bespreek, o.a. die vermindering van blare en die plastisiteit van die periant. Geskiedkundige aantekeninge word gegee asook 'n kort opsomming van die gekweekte basters.

Die grootste gedeelte van die werk bestaan uit beskrywings van elke soort met sy sinonieme en sy verspreiding, asook geskiedkundige aantekeninge by die ou soorte.

Daar is 'n kort lewensbeskrywing van die oorlede G. Joyce Lewis met 'n lys van haar publikasies.

NEW TAXA DESCRIBED AND NEW NAMES USED IN THIS PUBLICATION

SPECIES NOVAE

G. appendiculatus Lewis
bilineatus Lewis
calcaratus Lewis
comptonii Lewis
cylindraceus Lewis
engysiphon Lewis
exiguus Lewis
exilis Lewis
invenustus Lewis
kamiesbergensis Lewis
naacneilii Oberm.
marlothii Lewis
microcarpus Lewis
salteri Lewis
stefaniae Oberm.
uysiae Lewis
vermus Oberm.
vigilans Barnard
violaceo-lineatus Lewis
viridiflorus Lewis

SUBSPECIES NOVAE

G. inflatus Thunb. ssp. *intermedius* Lewis
maculatus Sweet ssp. *eburneus* Oberm.
vaginatus Bol.f. ssp. *subtilis* Lewis

VARIETATES NOVAE

G. alatus L. var. *meliusculus* Lewis
var. *pulcherrimus* Lewis
appendiculatus Lewis var. *longifolius* Lewis
brevifolius Bak. var. *minor* Lewis
var. *obscurus* Lewis
debilis Ker var. *variegatus* Lewis
gracilis Jacq. var. *latifolius* Lewis
pritzelii Diels var. *sufflavus* Lewis
punctulatus Schrank var. *autumnalis* Lewis
rogersii Bak. var. *graminifolius* Lewis
virescens Thunb. var. *roseo-venosus* Lewis

STATUS NOVUS

G. alatus L. var. *speciosus* (Thunb.) Lewis
carinatus Ait. ssp. *parviflorus* Lewis (nom. nov.)
debilis Ker var. *cochleatus* (Sweet) Lewis

G. ecklonii Lehm. ssp. *rehmannii* (Bak.) Oberm.
ssp. *vinoso-maculatus* (Kies)
Oberm.
floribundus Jacq. ssp. *fasciculatus* (R. & S.)
Oberm.
ssp. *milleri* (Ker) Oberm.
ssp. *miniatus* (Eckl.) Oberm.
ssp. *rudis* (R. & S.) Oberm.
inflatus Thunb. var. *louiseae* (L. Bol.) Oberm.
longicollis Bak. var. *platypetalus* (Bak.) Oberm.
maculatus Sweet ssp. *meridionalis* (Lewis)
Oberm.
ssp. *hibernus* (Ingram) Oberm.
ochroleucus Bak. var. *macowanii* (Bak.) Oberm.
oppositiflorus Herb. ssp. *salmoneus* (Bak.)
Oberm.
permeabilis Delaroche ssp. *edulis* (Ker) Oberm.
ssp. *wilsonii* (Bak.) Lewis
sericeo-villosus Hook. f. forma *calvatus* (Bak.)
Oberm.
tristis L. var. *aestivalis* (Ingram) Lewis
varius Bol. f. var. *micranthus* (Bak.) Oberm.
virescens Thunb. var. *lepidus* Lewis (nom. nov.)

NOMINA NOVA

G. mutabilis Lewis (*G. muirii* L. Bol. 1924, non
L. Bol. 1915)
rufonarginatus Lewis (*G. marginatus* Bol. f.
1917, non L.f. 1781)
sempervirens Lewis (*G. splendens* Bak. 1876, non
Herbert 1843)

NOMINA ET COMBINATIONES NOVAE (Species removed from other genera)

G. brevittubus Lewis nom. nov. (*Tritonia ventricosa*
Bak.)
leptosiphon Bol. f. [*Radinosisiphon leptosiphon*
(Bol. f.) N.E. Br.]

SPECIES EXCLUSA

G. aureus Bak. = *Homoglossum aureum* (Bak.)
Oberm.

Introduction

The name *Gladiolus*, meaning little sword and obviously referring to the somewhat sword-shaped leaves, was established in botanical literature by Linnaeus in his *Species Plantarum* (1753) and *Genera Plantarum* 36 (1754). Far earlier the ancient Greeks, using of course the Greek version of the name, *Xiphion*, mentioned them in their legends¹ and Theophrastus, Dioscorides and Plinius refer to them and their uses in their writings, for the corms of the purple-flowered *Gladiolus segetum*, which grew in their cornfields, were roasted and eaten. In the Middle Ages several species were illustrated in Herbals while serfs working in the fields often wore the corms as amulets. The presence of the plants in cornfields led to the English name Corn Flag.

The genus *Gladiolus* is represented throughout Africa, on the island of Madagascar and in countries bordering the Mediterranean from where several have migrated further afield in Europe and Asia in more recent times with the cultivation of the land. The presence of two endemic species in Madagascar indicates the great antiquity of the genus, for their ancestors must have inhabited the island before it became separated from the African mainland.

The total number of species in the genus is probably about 180. Of these 103 are enumerated in this revision of species from southern Africa; 71 of these are endemic in the Cape winter-rainfall region while 10 others have a restricted distribution in the eastern Transvaal. In general they are well represented in all parts of Africa, deserts excepted, grow at low to high altitudes, many of them being endemic in small areas; *G. gueinzii*, for instance, is confined to the sandy beaches along the south-eastern African coast whereas *G. saundersii*, *G. microcarpus* and several others are found above 3 000 m in the Drakensberg. In the Cape winter-rainfall region several species grow inside clumps of Restionaceae, which afford them protection from grazing animals and moles.

Cytologists' records have revealed that the Cape species possess a low number of chromosomes ($2n = 30$) whereas in those from Europe the numbers vary from $2n = 60$ to 180. In between these two extremes falls the *G. natalensis* (*quartinianus*) clan, distributed from the eastern Cape to Ethiopia and Arabia, showing a varying number of polyploids ($2n = 75-90$). These results point to a southern origin. The forest flora of the south-eastern Cape is generally considered to represent the oldest type of vegetation in the Cape Floral Region. It seems possible that it could be the focal point of speciation and distribution of the genus. Species belonging to all the different groups and mostly with a widespread distribution occur in this area. Here, too, we find the small-flowered, rather colourless *Gladiolus stellatus*, regarded as the most primitive species; the flower has a regular perianth with the three stamens placed

¹ There is a charming legend which tells us of two brothers who fell in love with the same girl. Their love for one another turned into hate and they fought until both were fatally wounded. Realizing too late the folly of their deeds they drove their swords into the ground and there a flower emerged, the flower of peace.

around the central style and a branched inflorescence. Other characters, including the winged seeds, agree with the general concept of *Gladiolus*. It is interesting to note that Thunberg accepted it as a *Gladiolus* but Louisa Bolus placed it in the related genus *Geissorhiza*. It is related to the more advanced *Gladiolus permeabilis*, a common, variable and widespread species. It is on the furthest western borders of the winter-rainfall region on the mountain ranges at high altitudes that isolated colonies have evolved into separate species, e.g. *G. kamiesbergensis* and *G. buckerveldii*, although the former still shows its affinity to *G. permeabilis* and the latter to *G. angustus*.

Two organs regarded of importance in speciation (and incidentally in hybridization) are firstly the leaves, which have either increased or decreased in size and number during evolution and, secondly, the labile or unstable perianth which still exhibits variability, even within the species, namely the elongation of the tube and/or limb and its shape. The majority of summer-rainfall species have more and larger leaves and bigger flowers, or, if the flowers remained small, they became more numerous. They represent the most successful colonizing group and, being adaptable to environmental change, several became the ancestors of our garden hybrids. In contrast the winter-rainfall species show reduced leaf surface and some exquisitely shaped, often delicately perfumed, flowers such as the Pypies, Bells and Kalkoentjies. Unfortunately for horticulture these more sophisticated species are mostly difficult to cultivate.

G. permeabilis, mentioned above, is a good example of a species with a very variable perianth; in the subspecies *wilsonii* from the eastern Cape, the lobes are ovate in shape but, further west, the plants display lobes that become more and more attenuated both below and above, leading eventually to the subspecies *edulis* with its long spidery tips. In other species it is the tube which elongates, sometimes disproportionately so, e.g. in *G. buckerveldii* and *G. angustus*.

Several attempts have been made to divide the genus into subgenera, the latest being Baker's treatment in the *Flora Capensis* 6 (1896), where the South African species were placed in 3 subgenera. The third, subgenus *Schweiggera*, has since been removed to the genus *Tritoniopsis* by Lewis. The second, subgenus *Hebea* (Hedw.) Persoon, was established to include those species in which the perianth-lobes tapered basally to form claws, combined with a few other characters of minor importance. R. C. Foster in *Contr. Gray Herb.* No 127 : 36 (1939) pointed out, however, that of the six species Persoon listed under his subgenus only one has remained in *Gladiolus*, viz. *G. orchidiflorus*. Baker added 10 more species closely related to *G. orchidiflorus* and they do form a natural group, but the character of the clawed lobes is so variable and the differences from one species to the next so gradual that one cannot circumscribe this subgenus. In fact no really constant set of characters could be discovered for a division. So, for the sake of convenience, the species are here divided into 4 groups depending on the maximum number of well-developed leaves that

can be produced by the plant, or their suppression, at the time of flowering. It must be stressed however that the boundaries between the sections are fairly arbitrary and it will often be necessary to consult keys to other groups as well when dealing with depauperate or juvenile individuals with fewer leaves than average.

Of the 4 groups, the second, the *Paucifoliati*, appears to be the most primitive, the first, the *Plurifoliati*, the most successful and widespread, and the third and fourth, the *Unifoliati* and *Exfoliati*, the most reduced or specialized. In each group there is a further division; on the one hand species with fairly regular funnel-shaped, often large, flowers and on the other those with zygomorphic, prognathous or hypognathous often rather small flowers. There is no sharp distinction between these two categories, however. In some species the flowers may vary from fairly regular to irregular, e.g. in *G. natalensis*, *G. inflatus*, *G. floribundus*, etc.

The *Plurifoliati* group, which evolved by the production of more and larger leaves, became the most successful and widespread; presumably this was because of the greater assimilating capacity which gave rise to more vigorous growth. The species predominate in the summer-rainfall region. Many bear large or medium-sized flowers; but if flowers are smaller they are usually more numerous. It is interesting to note that *G. cardinalis*, the lovely red Nuwejaars-bloom, belonging to this group, has penetrated furthest west into the winter-rainfall region because it inhabits the banks of permanent mountain streams and still flowers in summer, whereas the usual time of flowering in the winter-rainfall region is in the spring or autumn. Closely related to it is *G. sempervirens*, which makes its home in the forests around George and Knysna where because of the all-the-year-round moist, mild climate the species has dispensed with the formation of a corm; it develops a somewhat rhizomatous rootstock with moniliform runners and many long-living leaves. In the eastern Cape we meet with another evergreen species, *G. ochroleucus* and its variety *macowanii*, which also possess fairly permanent leaves, no doubt an adaptation to the temperate climate. These plants lacking corms well stocked with food reserves are difficult to transplant and do better in cultivation if seeds or cormlets are used. To this *Plurifoliati* group belong the more important ancestors of our garden hybrids: the species involved, *G. natalensis*, *G. oppositiflorus*, *G. saundersiae* and *G. cruentus*, all possess the funnel-shaped, fairly large regular type of perianth.

The species placed in the *Paucifoliati* group are nearly all inhabitants of the Cape Province and amongst them is *G. carneus*, used in some of the first crossings by plant breeders in England until substituted by the species of the *Plurifoliati* group mentioned above. Also included amongst the *Paucifoliati* are the attractive Kalkoentjies and most of the species placed in the subgenus *Hebea* by Baker, which have zygomorphic, often orchid-like flowers, where the individual perianth-lobes vary much in shape and stance.

The two remaining groups, the *Unifoliati* and the *Exfoliati*, also occur predominantly in the winter-rainfall region where they exhibit a high degree of

speciation; and while some are widely spread, many species are very localized—being only known from one small area.

In the *Unifoliati* a single narrow basal leaf is produced and the 3–4 cauline leaves are much reduced, sheathing the stem and terminating in short free tips. To this group belong the Pypies, Bells and Aandblomme. The white evening-scented Aandblom, *G. tristis*, was used in early crossings with *G. carneus* and *G. cardinalis*.

The *Exfoliati* flower precociously in late summer and autumn in the Cape and in early spring in the summer-rainfall region. The flower spikes are produced with great rapidity from the dormant corm before or at the beginning of the rainy season and in the earliest flowering species before any new root action begins. The flower spike arises from the usual two or three prophylls, the basal leaf is reduced, sheathing the stem for almost its entire length with no—or only a very short—free blade, the one to three cauline leaves being entirely sheathing and bract-like. After the commencement of the rainy season when the non-flowering corms send up their leaves, the flowering corms in many of these species also send up one or more long sterile leaves from a side-bud. More information is required on the subsequent development of the flowering corms, but it seems that in one or two of the earliest flowering species, *G. jonquilliodorus* and *G. carmineus* for example, the flowering spike does not succeed in forming a new corm at the base and the life of the plant continues through the corm formed at the base of the leaf-bearing side-bud. In other species two new corms are formed during the growing season—one at the base of the precocious flower spike and one by the leaf-bearing side-bud—neither of which may be large enough to flower the following year. In some of the later flowering species, *G. maculatus* for example, the flowering spike continues green and alive throughout the rainy season until the spring and, despite the very reduced leaf blades, will set a corm that is capable of flowering again the ensuing year and a leaf-bearing side-bud is not usually produced.

As previously mentioned, Lewis had excluded the genus *Homoglossum* although so closely related; and *G. aureus* Bak. is removed to *Homoglossum* as *Homoglossum aureum* (Bak.) Oberm., for, although the shape of the flower is different, in corm, leaf and seed it so closely resembles *Homoglossum merianellum*.

The genus *Acidanthera* Hochst., founded on the heavily scented long-tubed plant from Ethiopia, should probably be sunk under *Gladiolus*. The miscellaneous collection of long-tubed South African species erroneously included by Baker under *Acidanthera* in the *Flora Capensis* 6 (1896) have been transferred to other genera—cf. Lewis *Jl S. Afr. Bot.* 7 (1941). A list with the current names is given below.

The genus *Sphaerospora* Klatt (non Sweet), based on *Gladiolus flexuosus*, was transferred to *Tritoniopsis flexuosa* (L.f.) Lewis, in *Jl S. Afr. Bot.* 25 (1959). Phillips, in his *Genera of South African Flowering Plants* ed. 2 (1951) placed *Chasmatocallis* R. C. Foster *Contr. Gray Herb.* n.s. No. 127 : 40 (1939) as a synonym of *Gladiolus*; it is *Lapeirousia divaricata* Bak. Salisbury, in *Gen. Plant.*

Fragm. 142, 143 (1864) split off the genera *Symphydolon*, *Ballosporum*, *Ophiolyza*, *Hyptissa* and *Ranisia* from *Gladiolus* but they were never accepted by subsequent authors.

Species of *Acidanthera* cited in the *Flora Capensis* 6 (1896) have been identified as follows:

- A. brachystachys* Bak. = **Babiana brachystachys** (Bak.) Lewis
- A. brevicaulis* Bak. = **Hesperantha brevicaulis** (Bak.) Lewis
- A. brevicollis* Bak. = **Gladiolus gueinzii** Kunze
- A. capensis* Benth. = **Tritonia flabellifolia** (DeLaroché) Lewis
- A. flexuosa* Bak. = **Tritoniopsis flexuosus** (Thunb.) Lewis
- A. forsythiana* Bak. = **Gladiolus floribundus** Jacq.
- A. graminifolia* Bak. = **Gladiolus floribundus** Jacq.
- A. huttonii* Bak. = **Hesperantha longituba** Bak.
- A. ixioides* Bak. = imperfectly known.
- A. pauciflora* Benth. = **Gladiolus floribundus** Jacq.
- A. platypetala* Bak. = **Gladiolus longicollis** Bak.
- A. rosea* Schinz = **Engysiphon roseus** (Schinz) Lewis
- A. tubulosa* Bak. = **Engysiphon exscapus** (Thunb.) Lewis pro parte.
- A. tysonii* Bak. = **Hesperantha grandiflora** Lewis

History of the South African Gladiolus Species

1665–1740 Of historical interest, but not of real taxonomic value are the old water-colour paintings often bound into MS. volumes and referred to as codices, such as the Codex Witsenii, Codex Simon van der Stel, etc. Encouraged by Governor Simon van der Stel and later his son, Willem Adriaan, a large number of water-colours were painted by artists living at the Cape, the best known and most prolific being Heinrich Claudius, who accompanied Bergh and later Simon van der Stel on his big expedition to Namaqualand, 1685–6. These paintings were copied again and again in the following years, the copies usually becoming more stylized and so poor in some instances that only by matching them with the original or a good copy can they be assigned to a species or genus. Many were published in old books during the first half of the eighteenth century.

The MS. Journal ('Dag Register') of the Expedition to Namaqualand by Van der Stel was discovered at Trinity College, Dublin, Ireland and is thought to be the original by Waterhouse, who published a book on it in 1932. In it two species of *Gladiolus* are figured and described, t.801 being possibly *G. carinatus* and t.829 *G. alatus*. The same two figures are also reproduced in Plukenet's *Phytographia* etc. (t.187, f.4; t.87 f.1. 1691–1705) and Petiver's *Gazophyllacii* etc. (t.224, f.8; t.58 f.2. 1702–9) from originals in Bishop Compton's set in the British Museum, London.

Nicolaas Witsen, a leading figure in Amsterdam in the late seventeenth century and for many years its burgomaster, owned three volumes of water-colours which are now referred to as the Codex Witsenii and these Johannes Burman inherited. The latter used a number of these for his *Decades* etc.; likewise Breyne, who in his *Prodromus* etc. (1739) on t.7 illustrated two species of *Gladiolus*, figure 1 being possibly that of *G. maculatus* and figure 2 that of *G. carneus*.

At least five MS. picture-folios are preserved in South African libraries; two in Cape Town; one of these in the South African Museum and the other in the South African Public Library. They are dealt with by K. H. Barnard (1947). One of the two volumes in the Africana Museum, Johannesburg contains pictures of plants and was the subject of a recent article by Macnae & Davidson (1968). The fifth volume is in the Mary Gunn Library, Botanical Research Institute, Pretoria, and was written up by Jessop (1965).

The folios of the South African Museum and South African Public Library both contain the water-colour of *G. carinatus*, which agrees with that of the Trinity College folio, t.801, but only *G. alatus* is featured in the volume of the South African Museum (t.115 = t.829 of the Trinity College folio). In the Johannesburg and Pretoria volumes several other *Gladiolus* species are figured. Besides the three species previously mentioned, *G. carinatus*, *G. alatus* and ? *G. maculatus*, there are also illustrations of *G. carneus* and *G. gracilis* in the folio

Icones Plantarum et Animalium of the Africana Museum. In the Pretoria volume, which was annotated by J. Burman, at least twelve water-colours, some of an exceptionally high standard, figure species of *Gladiolus*, namely the following: No. 8, *Gladiolus* sp., could not be identified with certainty. No. 20, *G. alatus*; No. 47, *G. carneus* (=Breynius t.7 f.2); No. 68, *G. carneus*; No. 78, *G. angustus*; No. 100, *G. brevifolius*; No. 102, *G. liliaceus*; No. 109, *G. maculatus* (=Breynius t.7 f.1); No. 113, *G. tristis*; No. 114, *G. punctulatus*; No. 122, *G. hyalinus*; No. 128, possibly a *Gladiolus*; No. 131, *G. blommesteinii*. All these species are common around the Cape Peninsula to this day.

There seems to be no conclusive evidence that any South African species of *Gladiolus* had been grown and flowered in Europe before 1700.

1727 In 1727 Boerhaave in his account of the Leiden gardens gave a brief description of an African *Gladiolus* that was undoubtedly *G. angustus* L. When Linnaeus reached Holland he found this species flowering in George Clifford's garden and doubtless elsewhere. He had already accepted Tournefort's *Gladiolus* as the generic name for the common European species and in the *Hortus Cliffortianus* he published a description of this African species as '*Gladiolus foliis linearibus*' together with a plate by Ehret (1738). In the same year Linnaeus returned to Sweden, and in 1741 was appointed to the professorship at Uppsala University.

1745 It is possible that another species, *Gladiolus tristis*, had been in cultivation for some years before Philip Miller flowered it in the Chelsea Gardens in 1745.

1750 Trew published in his *Plantae Selectae* a beautiful plate by Ehret of a fine form of this species under the name of *Lilio-Gladiolus*.

1753 Linnaeus published his *Species Plantarum* with his binomial system, the basis of all future taxonomic systems. To the two species of the *Hortus Cliffortianus*, now named *G. communis* and *G. angustus*, Linnaeus added four other plants (including three South African species, i.e. *Melaspheerula*, a *Thereianthus* and an *Aristea*). So *G. angustus* was still the only South African *Gladiolus* recognized by Linnaeus.

1755 Philip Miller began the publication in monthly parts of his *Icones* and on plate 40 he illustrated an '*Antholyza*' which is in fact a form of *Gladiolus floribundus* subspecies *floribundus*, wrongly identified later by Ker as synonymous with his *G. milleri* and here cited under the type subspecies (q.v.).

1757 Miller published sub *Gladiolus* on plate 142 of his *Icones* an illustration of *G. angustus*.

1758 The following year Miller published a special number of six plates of South African Iridaceae that he had recently flowered in the Chelsea Gardens. Three species of *Gladiolus* without specific names were included. A yellow form of *G. tristis* and two species subsequently named *G. recurvus* L. (1767) and *G. involutus* Delaroche (1766).

1759 Linnaeus reported to Burman (letter dated 20 July 1759) that *Gladiolus tristis* had flowered that year at Uppsala, probably from corms sent by Miller in a collection of 'Cape Bulbs' in 1756. Possibly Linnaeus had flowered this species previously. He was able anyhow to include the name without a description in the *Dissertation 'Flora Capensis'* published that same year.

1760 This is a very important year for South African botany. In May the younger Burman arrived in Uppsala. In June his father sent a 'huge chest' by sea containing a large collection of Cape plants, and possibly, though this is unfortunately not absolutely certain, the volumes of Oldenland's Herbarium which Burman had purchased in 1756. Throughout the Long Vacation (July–September) Linnaeus, Schreber and N. L. Burman together studied this collection. After N. L. Burman's return to Holland, Linnaeus published (December 1760) his *Plantae Rariores Africae*. Of the 102 species therein described some 75 were based on Burman's specimens. Since the whole collection was on loan, the types were returned to Amsterdam and if they still exist should be in the Burman Herbarium at Geneva. One new *Gladiolus*, *G. alatus*, was described from this collection.

1762 Linnaeus published the first volume of the second edition of the *Species Plantarum*. He added to the genus *Gladiolus*. *G. alatus* was only briefly described, since the species had been fully described in the *Plantae Rariores*, and *G. tristis* received a full description, since he had previously published the name only in the *Flora Capensis*. He did not include Miller's 1758 species.

1764 Burman sent Linnaeus as a gift, not on loan, a dried specimen of a *Gladiolus* with long acuminate lobes. Linnaeus seems first to have considered this plant was referable to *Ixia*, possibly because he assumed the flower was actinomorphic. He has labelled the specimen *Ixia* (LINN. 59.11), but when he wrote to Burman in August that year he had agreed that it was a *Gladiolus* and named it *Gladiolus undulatus*. He further noticed that the plant bore some resemblance to Miller's second *Gladiolus* illustrated in the *Icones* t.236 of June 1758. He must have written out his own description of Miller's plant, decided it was definitely different and named it *Gladiolus recurvus*. The description of these two species, almost certainly made in 1764, was published three years later in the first *Mantissa* (October 1767).

1766 In August of this year, David van Royen's pupil, Daniel Delaroche, published as his thesis for a doctorate the description of several new South African *Iridaceae*. These included three species of *Gladiolus* that Delaroche had found flowering in Van Hazen's nursery that summer. *Gladiolus carneus*, *Gladiolus permeabilis* and *Gladiolus involutus*—the last being the species that Miller had illustrated and described without a specific name in the special number of the *Icones* in June 1758. In addition he described also from a dried specimen *Ixia quadrangula* which has recently been shown to be the actinomorphic *Gladiolus* described by Thunberg as *Ixia linearis* (*Gladiolus linearis* (Thunberg) N.E. Br.) and by Klatt as *Gladiolus biflorus*. Although Linnaeus received copies

of Delaroche's thesis from both Burman and David van Royen, he never accepted any of the species therein described.

1767–8 Between August 1767 and April 1768 four works of supreme importance to South African botany were published independently. The first was Bergius's *Plantae Capenses*, describing the collection that Michael Grubb had purchased from Auge in Cape Town. The collection contained no species of *Gladiolus*. Two months later Linnaeus published a new edition of the *Systema Vegetabilium* with a *Mantissa* or Supplement containing the detailed description of new species. The *Systema Vegetabilium* enumerates five species of *Gladiolus* from South Africa, *G. angustus* (1753), *G. tristis* (1759 and 1762), *G. alatus* (1760) and two new species, *G. undulatus* and *G. recurvus*, for which the full descriptions are given in the *Mantissa*. The following March N. L. Burman published as an appendix to his *Flora Indica*, his *Prodromus Florae Capensis*. It should be noted that Linnaeus had stopped all correspondence with the Burmans in January 1766. During the following two years when Linnaeus was working on the *Systema Vegetabilium* and Burman was completing his *Prodromus* there was no interchange of information. Moreover, although the *Systema Vegetabilium* was published in October 1767, Burman did not receive a copy until after the *Flora Indica* was published. Burman's *Prodromus* lists Delaroche's species and the three Linnaean species of the *Species Plantarum* 2, but not *G. undulatus* or *G. recurvus*, of whose publication Burman was unaware. He has added *G. galeatus* which he considered to be different from *G. alatus* L. (q.v.) and he described under the name of *Antholyza caryophyllacea* a plant with a strong scent and reddish flowers that flowered in his father's collection in April 1760. (See under *G. caryophyllaceus* for an elucidation of the identity of this much misunderstood species.)

Then in April 1768 Miller published not in parts, but in a complete volume, the 8th edition of his *Gardener's Dictionary*, incorporating for the first time the Linnaean binomials. Miller had to take his information from the *Species Plantarum* 2, for he was unaware of the publication of the *Mantissa* and the *Systema Vegetabilium*, indeed according to his letter to Linnaeus he was unable to obtain a copy of these works until August 1768. He omitted *G. alatus*, which he had never grown, and only records *G. angustus* and *G. tristis*.

1769 In this year Linnaeus received the first collection direct from the Cape. The Tulbagh collection arrived in the summer to be followed by the collection that König had made at the Cape in April 1768; neither contained any species of *Gladiolus*.

1771 Linnaeus published his second *Mantissa*, including the descriptions of numerous Cape plants from the Tulbagh and König collections. He had here an opportunity of recognizing, had he so wished, the species described by Delaroche and N. L. Burman, but they are not mentioned.

1772 In April of this year Thunberg and Sparrman arrived at the Cape. Sparrman sent three collections back to Linnaeus. He collected while at

Simonstown *Homoglossum priorii* and the early May flowering form of *G. gracilis* and later *G. alatus*, which he failed to recognize from the brief description in the *Species Plantarum* 2 and named '*labialis*' (cf. LINN. 59.4) and also *G. carneus*. Linnaeus mounted Sparrman's specimens, but made no attempt either to describe or name them. After only seven months at the Cape Sparrman joined Cook and the Fosters and sailed for the South Seas. Thunberg spent three years at the Cape. He was employed by the Directors of the Dutch East India Company, and was expected to send back to Holland bulbs, roots, seeds and dried specimens of all he collected. He was allowed to keep his own Herbarium but he was not supposed to supply anything to his friends in Sweden. Nevertheless he sent back hundreds of specimens to Linnaeus, Montin, Baeck and Bergius. The large collection he sent to Linnaeus in 1773 and the smaller ones he sent in 1774 and 1775 were only selections of what he had collected. He included various '*Gladioli*', *Babianas*, *Lapeirousias*, *Hesperanthas*, etc. But of the true *Gladiolus* species he sent nothing. In a sense he had none to send. He had collected *G. alatus* and what he thought was *G. angustus*. The sixteen or so other species that he collected he considered to be varieties of *G. tristis*. He seems to have been peculiarly uninterested in the genus at that time and to have assumed, perhaps rightly, that Linnaeus was too. It is possible that the unmarked and unnamed sheet of *G. carneus* ('*G. pappei*' form, LINN. 59.29) is a Thunberg specimen. Apart from this sheet there is no evidence that Thunberg sent any *Gladiolus sensu stricto* to Linnaeus.

1775 In March 1775 Linnaeus gave to an amanuensis all the MS. slips of new species described by him since 1771 to copy into a folio book ready for the publication of a *Mantissa* 3. This amanuensis draft contains descriptions of a large number of Thunberg and Sparrman plants. There were no true species of *Gladiolus* included. The work was never completed.

1778 In January Linnaeus died and his son decided to edit and revise his father's *Mantissa* 3.

1779 In April Thunberg returned to Sweden. The younger Linnaeus was still working on his father's manuscript. By June he had persuaded Thunberg to allow him to add, but only with the brief specific phrases, several hundred plants from Thunberg's MSS. Thunberg had no new species of true *Gladiolus* to offer. *Ixia linearis* was however included in the new *Ixias* and this, as has now been shown, is the same as *Ixia quadrangula* Delaroché and is a *Gladiolus*. It was not therefore a new species but it was the only true *Gladiolus* to be added. By the autumn the first draft was completed. The younger Linnaeus had decided to change the name to the *Supplementum Plantarum* since, as he explained to Baeck, he had so materially altered and enlarged his father's third *Mantissa*.

1780 In this year, while the younger Linnaeus was still trying to arrange for the publication of the *Supplementum*, Houttuyn produced the twelfth volume of the second part of his monumental *Natuurlijke Historie*. . . . This volume contained the Bulbous Plants. Under *Gladiolus* he listed the species published

by Linnaeus, Burman and Delaroche with descriptions in Dutch, to which he added sometimes observations based on specimens in his own herbarium, some of which he also used to illustrate his work. He published and illustrated one new species, *Gladiolus liliaceus*. He also described and illustrated from his Herbarium a *Homoglossum* as *G. recurvus* L. and what he believed correctly to be Burman's *Antholyza caryophyllacea*. But his publications were considered by his contemporaries to be merely popular, and they were almost completely ignored by subsequent taxonomists, who anyhow found his descriptions and illustrations often inadequate for positive identification. His herbarium was subsequently purchased by the younger Burman and incorporated in the Burman Herbarium and Houttuyn's types and the originals of his numerous illustrations are now in Geneva.

1781 The *Supplementum Plantarum* was at last published in Brunswick, adding, as has been noted before, only a new synonym, for Delaroche's *Ixia quadrangula* is a *Gladiolus*.

1783 Soon after his return to Sweden from his visits to London and Paris the younger Linnaeus died. According to Thunberg he had been working before his death on *Iris* and Thunberg's reconstituted *Moraea*, two genera in which both he and Thunberg were far more interested than in *Gladiolus*.

1784 With the publication of Murray's 14th edition of the *Systema Vegetabilium* incorporating all the new species from the *Supplementum*, the Linnaean period may be considered to have ended. Linnaeus and his son were dead. The Linnaean collections had been sold to Smith. The first great period of taxonomic botany was over.

1784–1830 Second Period

The publication of Thunberg's *Dissertatio de Gladiolo* in 1784 may be taken as the starting point of this post-Linnaean period. It covers the years when Cape bulbs as well as Cape Ericas and Cape succulents were so popular in European gardens. To meet this demand it was the period of the horticultural collectors; Masson's second visit for Kew, Jacquin's collectors Boos and Scholl, Niven collecting for George Hibbert and the great commercial collectors Ecklon, Zeyher and Drège, as well as the early explorers such as Burchell and Lichtenstein. The new Cape plants that were brought back were named and described and often illustrated by many authors.

1789 Aiton published his *Hortus Kewensis* with descriptions of two new *Gladiolus* species imported by Masson in 1773–5.

1789–97 Jacquin figured 16 species of *Gladiolus sensu stricto* in the second volume of his *Icones* with their descriptions in *Collectanea* 3–5.

1790–1825 Curtis began publication of his *Botanical Magazine* in 1786. The first Cape *Gladiolus* published therein was *Gladiolus cardinalis* in October 1790. From then onwards a succession of illustrations of *Gladiolus* spp. appeared, the last of this period being *Gladiolus debilis* in July 1825. From 1801 the descrip-

tions of *Iridaceae* were entrusted to J. B. Gawler (John Bellenden Ker). During these years the volumes of Redouté's *Liliacées* appeared with 8 plates of the genus *Gladiolus sensu stricto*.

1800 Thunberg published the second part of his *Prodromus*, elevating to specific rank the varieties of *Gladiolus tristis* that he had listed in the 1784 *Dissertatio de Gladiolo*.

1823 Thunberg's complete *Flora Capensis* edited by Schultes appeared at last.

1827 The second part of Sweet's *Hortus Britannicus* was published in January and later the same year Ker's *Genera Iridearum* and Ecklon's *Topographisches Verzeichniss* appeared. With the publication of these three works the second period in the history of Cape *Iridaceae* may be said to have ended.

Ker's summary of the genus *Gladiolus* is of great taxonomic importance. He listed 32 Cape species. He left Houttuyn's *G. liliaceus* among the *incertae* and also sub *Antholyza* Burman's *A. caryophyllacea*. Though aware of the necessity of recognizing the priority of the earliest published names, he preferred his own *G. viperatus* to Andrews's *G. orchidiflorus* published a few months earlier and he persisted in his confessed error in recognizing Jacquin's *G. undulatus* in preference to Linnaeus's original (1767) application of this name, and he misunderstood *G. recurvus* L. which he applied to the species named *G. carinatus* by Aiton. Some of his species are conspecific—*G. brevifolius* and *G. aphyllus* for example. The text seems to have been completed by 1825 for he omits any reference to *G. debilis* published in *Curtis's Botanical Magazine* that year. Though his conclusion requires much correction the work is a very important milestone in the history of the genus.

1830–96 Third Period

By 1830, the interest in Cape bulbs had waned. The culture of Cape *Gladiolus* species however was stimulated by the interest in the hybrids originally raised by Dean Herbert at the beginning of the century and continued by various nurserymen. These were hybrids of *G. cardinalis*, *G. tristis* and *G. carneus* (*blandus*) which were hardy enough to be planted in the open in the autumn and flowered with the roses in June. Of more importance was the introduction at this time of two summer-flowering species, *G. natalensis* and *G. oppositiflorus*, and the raising of summer-flowering hybrids therefrom.

New species mainly from the summer-rainfall area were introduced and described from time to time. But no important revision of the Cape *Iridaceae* was to be attempted for nearly fifty years. When in 1876 Baker published his *Systema Iridacearum* he explained that he was attempting to do for 1876 what Ker did for 1827. 'How it comes', he wrote, 'that the *Iridaceae* have been so much neglected by systematists, I have never been able to understand.' Except for Dr Klatt's papers scattered through several volumes of *Linnaea* no revision of the order had been attempted since Ker's publication. Baker was to follow up his *Systema* by the *Handbook of the Irideae* in 1892, but it was in the

6th volume of the *Flora Capensis* in 1896 that Baker completed his revision, a publication which may be taken to mark the end of the third period in the history of the genus.

A few important dates only during this long period need be cited here.

1830 In Curtis's *Botanical Magazine* for 1830 Hooker published the first account of *G. psittacinus*, a name he subsequently corrected to *G. natalensis* (q.v.).

1837 Dean Herbert published in his *Amaryllidaceae* a description of the new summer-flowering species *G. oppositiflorus* and in the following year Hooker illustrated the pink flowered form as *G. mortonianus*, Curtis's *bot. Mag.* t.3680.

1864 Corms of *G. papilio* were received at Kew. The species was illustrated and described two years later in Curtis's *Botanical Magazine* t.5565. The remarkable colour form *G. purpureo-auratus* was described six years later in Curtis's *Botanical Magazine* t.5984 (1872).

1868 *G. cruentus* was first described by S. Moore in *Gardener's Chronicle* and illustrated the following year by Hooker f., Curtis's *Botanical Magazine*, t.5810.

1870 In Curtis's *Botanical Magazine* t.5873 Hooker described and illustrated *G. saundersii* from corms collected by Cooper in the Herschel District of the Cape. These species were soon established in general cultivation and used for hybridizing with the *gandavensis* hybrids.

1876 Baker published his *Systema Iridacearum* and in the same year described *G. 'splendens'* (*G. sempervirens* q.v.) in the *Journal of Botany* (London).

1884 MacOwan and Bolus sent a collection of Cape Iridaceae to Dr Klatt in Berlin. Klatt reported on these in a paper published in *Transactions of the South African Philosophical Society* at the end of 1885, describing several 'new' species among them *G. macowanianus* (= *G. carneus*), *G. biflorus* (= *Ixia linearis* L.f. = *G. quadrangulus*, q.v.), *G. templemanii* (= *G. virescens*) and *G. ornatus* Klatt, q.v.

1892 Baker's *Handbook of the Irideae* was published with full descriptions of the species which he had not done for the *Systema Iridacearum*.

1896 The first part of the 6th volume of the *Flora Capensis* was published in April of this year, which concluded the revision of the genus *Gladiolus* begun by Baker in 1876.

1896-1971 Baker's volume of the *Flora Capensis* was the standard work for the *Iridaceae* for the next 50 years despite the many faults and misidentifications that were to become apparent to later workers. There was no other work available.

1906 Wright described in Curtis's *Botanical Magazine* t.8068 *G. carmineus*.

1917 Bolus f. published in the *Annals of the Bolus Herb.* 2, under Novitates Africanæ, 16 new species of *Gladiolus* of which nine are accepted in this revision.

1928 N. E. Brown published an analysis of the *Iridaceae* of Thunberg's Herbarium (*Journal of the Linnean Society*, 48, April 1928) containing numerous name changes in the genus *Gladiolus*.

1929 And in the following year N. E. Brown published in the *Kew Bulletin* two articles on the *Iridaceae* of Burman's *Prodromus* with further name changes. Further research has invalidated many of N. E. Brown's proposals in both these works.

1931-3 Capt. Collingwood Ingram, who had collected many species of *Gladiolus* during an expedition to South Africa in 1927, described some new species and varieties in the *Gardener's Chronicle* from plants flowering in his garden in Kent. Most of these proved to be synonyms.

1918-39 During this period Dr Louisa Bolus and later Dr G. J. Lewis described a number of new species, mainly from the Cape, many of them in *South African Gardening and Country Life*. A list of Dr Lewis's publications is given on pp. xii-xiii.

1963 In 1963, having completed her revision of *Ixia*, Lewis began on the revision of *Gladiolus*. She had visited many of the European herbaria in 1949, but for her work on *Gladiolus* she found it necessary to go again in 1966. From her studies of old types and of the literature not available in South Africa, she was enabled to make several necessary name changes and her last publication before her death was to record in the *Botaniska Notiser* 119 (1966) four name changes for Thunberg's species.

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Morphological Notes

Roots

One to several contractile roots are usually formed by the young corm. Besides pulling the corm deeper into the ground and bringing forth long thin side roots, they probably also serve as temporary storage organs. The large number of ordinary roots emerging in a circle from the base of the corm are branched and often long. In plants living in marshes they often have a spongy outer covering.

Corm

As can be expected, there is a close relationship between type of corm and environment. In the eastern Cape in the regions with a high rainfall and a mild climate all the year round, the evergreen *Gladiolus sempervirens*, not needing a large storage organ, develops a rhizomatous type of corm; it forms beaded runners, i.e. young rhizomes which grow out into new plants. *G. ochroleucus* behaves in a similar fashion. Compact small hard globose or ovoid corms enveloped by woody clawed tunics which, with expansion, break up from the base, are a feature of many of the Cape winter-rainfall species with reduced leaves. In many of these the production of sufficient reserve food in a corm is a slow process often taking up to three years before it is ready to flower. In between these two extremes a large variety of corms small or large with fibrous or papery tunics are developed, sometimes forming a neck. *Cormlets* vary from few to numerous. They are either sessile amongst the tunics of the mother corm or developed at the end of short or long stolons; both types may be produced by some species, e.g. *G. alatus*. In *G. alatus* moreover and also *G. gueinzii*, both psammophytes with a fluctuating sandy covering above the corm, cormlets may develop in the axils of the long attenuated sheathing bases of the lower leaves. In a number of species the plants form small clumps, e.g. *G. natalensis*, *G. varius*, *G. ochroleucus*, etc., but the majority grow singly.

Leaves

They show much variation in size and number but the optimal number that will develop under normal conditions appears to be predetermined for each species. At commencement of growth 2–4 tubular prophylls are pushed up through the ground-covering to pave the way for the shoot. Their length also depends on the surroundings. In hot dry sandy areas the sheaths are long indeed for the corms burrow deep down to protect themselves from desiccation and heat. In more congenial surroundings the prophylls are often free and form short blades. In *G. carinatus*, *G. viridiflorus* and occasionally *G. rogersii*, the sheath is spotted with purple or brown speckles.

Emerging centrally from inside the prophylls are 2–6 leaves produced by

the corm in the *Plurifoliati* and *Paucifoliati* groups. They form a distichous fan but, in fewer leaved specimens, they may form a lax spiral or appear sub-distichous. In the evergreen species *G. sempervirens* and *G. ochroleucus*, a new set of leaves develops through the older persisting leaves and one may count up to 16. The lamina is isobilateral and varies from linear to ensiform to falcate. In those that have a pseudoterete blade, the midrib and margins are thickened, the blade being often cruciform in cross-section, and the apex is often spinescent.

The following 3–4 stem-leaves show all stages of reduction from a leaf to a small bladeless sheathing bract. In the groups with fewer leaves those originating from the corm are repressed except for the basal one. This reduction can be observed in starved or juvenile plants in the *Plurifoliati* and *Paucifoliati* groups where only one basal leaf develops and the cauline leaves are reduced in size, as happens for instance in *G. carneus* and *G. caryophyllaceus*. This pattern of leaf reduction becomes established in the *Unifoliati*, all the species having one short or long basal leaf and 2–3 long sheathing and often bract-like cauline leaves. In the *Exfoliati* where the basal leaf subtending the flower spike is reduced to a sheath with little or no free blade, the diagnostic linear or pseudoterete leaves are only produced after the flowering season from non-flowering corms or from side-buds on the corms that have flowered. Since they are not present at flowering time, they are seldom to be found on herbarium sheets. It must be stressed once more, however, that although normal specimens will probably key out into one of the four groups, many will not for there is no sharp demarcation between the groups and this is especially so where flowering times overlap in the *Unifoliati* and *Exfoliati*. Here the basal leaf may still be short in an early flowering form of the *Unifoliati*, e.g. *G. gracilis*, and the plants are then very similar to those of some species placed under the *Exfoliati*, e.g. *G. maculatus*, which has a fairly long free tip to the bracts and flowers late in winter.

Inflorescence

The branched inflorescence appears to be the more primitive and is present in *G. stellatus*, *G. permeabilis* and a number of others, but even here side-branches are suppressed in depauperate individuals. A well-developed spike will produce 1–2–3 side-branches which come into flower later than the main spike. In the more specialized species an abbreviated basal side-branch may appear in a particularly luxurious plant but in the Pypies and Bells it seems to have been suppressed altogether.

In a few species, e.g. in typical *G. oppositiflorus*, *G. sericeo-villosus* and *G. elliotii*, the spikes are distichous but in all the others secund. The number of flowers per spike also varies considerably as a result of external circumstances; in *G. crassifolius* and its close relatives up to 40 flowers is no exception. In bud and often afterwards in fruit, the arrangement is distichous, but during anthesis the flowers are turned to one side and the inner bract moves to a position inside the outer bract. The outer and inner bract (or bracteole) are persistent,

often distinctly accrescent, and nearly always large and green. The side-branch is found in the axil of one bract or more of the upper often bract-like cauline leaves, but the flowers always have an opposing outer and inner bract the latter smaller, bifid or bidendate and 2-ribbed. Many other Iridaceous genera also possess these opposing flower bracts. There has been much speculation on the origin of the inner bract or bracteole, whether formed from one or two modified leaves. Lewis in her thesis decided that there were two originally which became fused, but Ingeborg Haeckel¹ and others from the German school suggest that it is through pressure against the rhachis that the central area is widened by being pushed to either side, the central midrib thus splitting lengthwise to form two parallel ribs with an area of soft tissue in between. This controversy is very involved, and is here best left alone but one observation is perhaps of interest. In *G. sericeo-villosus* and *G. elliotii* the bracteole is tubular below. The rhachis forms sharp longitudinal ridges and the two wings of the bracteole jutting out dorsally from the ribs are fitted tightly against the two facing ridges.

Perianth

The 6 lobes, which are fused below, are made up from 2 whorls; the upper lateral lobes and central lower lobe form the outer, and the central upper lobe and lower laterals the inner. In hybrids however this pattern is sometimes reversed. As was mentioned in the Introduction this organ is very variable. The difference between a regular and an irregular perianth is possibly controlled by a gene. However, Haeckel¹ showed experimentally that where gravity was eliminated in flowers revolving on a klinostat, the zygomorphic pattern changed to a regular one, even the blotches present on the lower lip moving to concentric positions.

Colour

White, pale pink or pale mauve appear to be primitive colours. Darker medial lines may develop and especially on the lower lobes attractively patterned honey guides, such as found on the Painted Ladies, may be seen. In the Kalkoentjies and some Bells, gaily coloured transverse bands run across the lower lip. The flower may become speckled or lined or the reticulate veining may show up in a darker tone. In several Cape species with a deep dark colouring such as browns, purples or maroon, the throat forms a transparent focal point, possibly attracting insects. The species with possibly the most complex colouring is *G. liliaceus* where the suffused browns of the day change to a greyish blue at dusk and back to brown again when it becomes light. The texture of the darker-hued perianths is usually firmer than that of the white, pink or mauve blooms, which are often thin and delicate. In several species albinos have been recorded.

¹ Haeckel, I. Ueber Iridaceen, *Flora* **125** : 1-82 (1931).

Nyctinastic movements

Several species possess perianths that close at night, e.g. *G. stellatus*, *G. quadrangulus*, *G. floribundus*, etc., whereas the Aandblomme or Evening Flowers, e.g. *G. longicollis*, *G. liliaceus* and *G. tristis*, open more fully in the evening when they emit a delicate scent.

Scent (T. T. Barnard)

It is possible that all species of *Gladiolus* emit a scent but only in a few species does this fall within the range of appreciation by the human olfactory sense. The species from which the modern summer flowering hybrids have been derived are all 'scentless' to the human nose. So are the 'painted ladies' of the *G. carneus* complex and the *G. cardinalis* group among the winter growers. Of the species which can be described as 'scented', many produce a scent which, though appreciated by the majority, others are unable to smell at all. A few, notably *G. liliaceus* and *G. tristis*, only produce an appreciable scent after sunset. In others the scent varies in intensity during the twenty-four hours and according to the climatic conditions. In some scented species, *G. carinatus* and *G. tenellus* for example, there are populations that must be considered completely scentless, while in *G. carinatus* populations occur in which some plants are strongly scented and others appear to have no scent. It is probable that everyone is aware of the heavy rather unpleasant scent of *G. caryophyllaceus* and of the strong evening scent of *G. tristis*. But *G. recurvus* and *G. virescens*, whose scent most people rate as equally strong, and very pleasant, others are unable to smell. Species here described as scented produce a scent that can be appreciated by at least some people, although individuals may vary widely in their estimates of its strength and in their opinions as to what other scent they think it resembles.

Stamens

In *G. stellatus*, *G. brevittubus* and occasionally in *G. gueinzii* and *G. floribundus*, the stamens are symmetrically placed around the central style and this can be considered a primitive arrangement. In all the others they are placed close together dorsally against the upper central lobe with the style in their midst and the stigmatic branches just overtopping them at anthesis. The filaments are fused to the perianth tube below, near the middle; in *G. alatus* they are often minutely pubescent. The anthers consist of 2 parallel sometimes apiculate locules which become separated basally and are sometimes shortly to distinctly caudate, as in *G. calcaratus* and *G. appendiculatus*. The caudate appendages hang down inside the throat of the perianth tube. When an insect enters the tube these tails are pushed up, causing the locules to come down and pollen will be brushed off on the back of the insect.

Gynaecium

The ovary is typical of the *Ixiodeae*, 3-locular with many axillary ovules. The style is slender and terete (occasionally minutely pubescent in *G. alatus*) and

the three stigmatic branches are conduplicate, and oblanceolate to obovate with papillate to fimbriate margins.

Capsule and Seed

In shape the capsule is mostly oblongo-ellipsoid to obtusely triangular with the ribs sometimes prominent; in texture the walls are thin, somewhat leathery to chartaceous, often distinctly reticulate-veined. The seeds in the South African species (*G. pretoriensis* excepted) possess a broad membranous circular wing, consisting of loose large cells containing airpockets, which ensures lightness and wind dispersal. An exception is *G. pretoriensis* where only a ridge or vestigial wing is present. Some European species also lack this wing.

The time needed for the ripening of the capsules and seeds varies a great deal, from a few weeks to a few months. On the whole the seeds mature quickly in those species that flower early in the season giving the seeds a chance to germinate and become established during favourable weather. Examples are *G. brachyphyllus* from the summer-rainfall area and *G. engysiphon* and *G. emiliae* from the winter-rainfall area. In late flowerers, e.g. *G. maculatus*, the ripening takes much longer and the seeds will only germinate the following season.

Description of Genus

Gladiolus L., Sp. Pl., ed. 1 : 36 (1753). Gen. Pl. 36 (1754); Thunb., Diss. Gladiolus (1784), Fl. Cap. ed Schult. 40 (1823); Ker, Gen. Irid. 129–130 (1827). Bak. in J. Linn. Soc. **16** : 170 (1877); Fl. Cap. **6** : 135 (1896); Benth. & Hook. 3, **2** : 709 (1883); Lewis in Adamson & Salter, Fl. Cape Penins. 256 (1950); Phil., Gen. S. Afr. Flow. Pl. ed. 2 : 219 (1951). Type species: *G. communis* L. Chromosome Numbers: $2n = 30; 60, 75, 90, 180$.

Hebea Hedw. f., Gen. **I** : 24 (1806).

Tilesia Thunb. ex Steud., Nom. ed. 2, **II** : 686 (1841) nom. nud.

Ballosporum Salisb., Gen. Pl. Fragm. 142 (1866); *Hyptissa* Salisb. l.c.; *Ophiolyza* Salisb. l.c.; *Ranisia* Salisb. l.c.; *Symphidolon* Salisb. l.c.

Cormogenous plants with the parts above ground deciduous or rarely persisting for some time, solitary or occasionally forming small clumps. *Roots* thin, long, branched, many, emerging from the base of the corm; one to several contractile roots are formed on the young corm. *Corms* firm, globose to ovoid, covered with soft to hard woody, often clawed tunics or with coarse to fine reticulate fibres; cormlets few to numerous, sessile or sarmentose, occasionally produced in the axils of the lower leaves. *Leaves*: with 2–4 basal sheaths or prophylls, the 2 lower usually suppressed or disintegrating at an early stage; the 2 upper short to long, occasionally spotted; normal leaves 1–8(–16) varying in number in the different species, tubular below, isobilateral, laxly resolute to distichous, often forming a short imbricate fan. The upper leaves along the stem usually reduced, bract-like; lamina glabrous or rarely puberulous, linear, lanceolate, ensiform or falcate or pseudoterete when the narrowly linear lamina produces a raised midrib and winged, involute margins. In some species the leaves develop after flowering from a daughter bud. *Inflorescence* branched or a simple spike; outer and inner bracts usually fairly large, green persistent, often accrescent, the inner bidentate to bifid and bicarinate, occasionally tubular below. *Flowers* one to several to many (up to about 40) on a spike, secund, rarely distichous. *Perianth* zygomorphic, rarely somewhat regular, very variable, small to large, variously coloured, blotched or striped, scented or scentless; tube short or long, straight or usually curved, tubular to funnel-form; lobes 6, subequal to very unequal; the outer whorl formed by the upper lateral lobes and the lowest ventral lobe, the inner by the upper central lobe and lower laterals; the lobes ovate to lanceolate often somewhat attenuated below to form a claw and/or above to form an acute to caudate apex. *Stamens* 3, placed close together with the style forming an arch in front of the dorsal lobe, rarely symmetrically placed around the erect style; filaments terete, glabrous or rarely minutely pubescent below; locules parallel, long and narrow, separated below point of attachment, often apiculate, occasionally with a short or long caudate sterile basal part. *Ovary* inferior, 3-chambered with many axillary

ovules, style terete, glabrous or occasionally pubescent basally; stigmatic branches 3, conduplicate, obovate to obcordate with a fimbriate to papillate margin. *Capsule* oblongo-globose to cylindrical, triangular or rounded in cross-section, chartaceous to leathery, often with prominent reticulated veins. *Seeds* with a wide wing, discoid or oblong, occasionally the wing absent.

A genus consisting of about 180 species, widespread all over Africa but mainly in regions with a fairly high rainfall; with the greatest concentration of species in the Cape winter-rainfall region; outside Africa with 2 species in Malagasy and about 15 in the Mediterranean region, Europe, Arabia and western Asia.

KEY TO GROUPS

Well-developed leaves or leaf present at time of flowering:

- Leaves 5-8 or more, rarely fewer, distichously arranged, forming a fan I *Plurifoliati*
- Leaves 2-5, distichously or spirally arranged II *Paucifoliati*
- Leaf 1, basal, the following reduced, bract-like with short blades, spirally arranged on the scape III *Unifoliati*

Well-developed leaves (or leaf) absent at time of flowering, the scape bearing 1-3(-4) sheathing bracts without or with small free blades IV *Exfoliati*

GROUP I PLURIFOLIATI

Leaves synanthous, distichous, 5-8 or more, arranged close together in a fan, fairly similar in size and shape (if fewer than anthers caudate, viz. *G. calcaratus* and *G. appendiculatus*; *N.B.* depauperate plants will develop fewer leaves). Species predominantly inhabitants of the summer-rainfall region with a few in the southern Cape, flowering in summer-autumn.

a Perianth large, infundibuliform, c. 9 cm in diam. with the spreading lobes deep red or scarlet with white markings on lower lobes:

Perianth tube more or less straight and limb fairly regular:

Spikes pendulous with the flowers at right angles to the rachis, found on banks of mountain streams in the south-western Cape 1. *G. cardinalis*

Spikes erect with ascending flowers:

Corms small, somewhat rhizomatous with beaded runners; an evergreen found in forests around Humansdorp, Cape 2. *G. sempervirens*

Corms well-developed, leaves deciduous; found on the Drakensberg in Natal and Lesotho 3. *G. cruentus*

Perianth tube curved, limb irregular with the upper lobe hooded, the other 5 spreading below in a semicircle; found on the Drakensberg in Natal and Lesotho 4. *G. saundersii*

aa Perianth large or smaller, variously shaped and coloured but not as above:

b Spikes with the flowers distichously arranged (viz. facing opposite directions) or, if secund during anthesis, flowers c. 10 cm long and leaves and bracts minutely pubescent:

Perianth c. 10 cm long with the tube and limb about equal in length, white or pink (flowers loosely secund during anthesis with leaves and bracts minutely pubescent in ssp. *salmonaeus*) 5. *G. oppositiflorus*

Perianth c. 5 cm long with a short curved tube:

Plants glabrous (leaves rarely sparsely pubescent below); leaves in a compact fan, acute with many fine close-set similar nerves; spikes up to 25-flowered with the flowers white speckled with purple or rarely plain white 6. *G. elliotii*

Plants pubescent (rarely glabrescent); leaves in an elongated fan, acuminate, with several raised ribs. Spikes up to 40-flowered with the perianth in various shades of pink and/or yellow, plain or faintly spotted 7. *G. sericeo-villosus*

-Natal 7/12/20
→ 3a *G. flavioguttatus*
-Lesotho

- bb* Spikes with the flowers secund (viz. all facing to one side) arranged in one vertical row or in 2 approximated rows:
- c* Perianth over 4.5 cm long, usually with a well-developed tube:
- d* Perianth patent or erect:
- e* Perianth lobes more or less equal in size:
- Bracts lanceolate-acuminate, turning cinnamon brown; perianth patent with a long thin tube 4–5 cm long:
- Leaves *c.* 8 mm wide, linear with a prominent margin and midrib, with fine close-set ribs in between; corm with a neck of cinnamon brown fibres; eastern Transvaal 8. *G. varius* var. *varius*
- Leaves *c.* 12 mm wide, linear-lanceolate with several prominent secondary ribs beside the margins and midrib; plants often evergreen and many-leaved; corm usually without a neck; eastern Cape 9. *G. ochroleucus* var. *macowanii*
- Bracts boat-shaped, large, somewhat inflated, equalling or longer than the perianth, glaucous green; perianth porrect with a short tube; flower white, speckled with purple, wine-red or pink or a plain pale mauve 10. *G. ecklonii*
- ee* Perianth hypognathous with the 3 lower lobes recurved and smaller than upper hooded lobes:
- Perianth tube twice as long as upper lobe, the lobes short and narrow; flower cream or greenish yellow, the lower lobes with a small central purple spot; endemic and rare on the Cedarberg where it inhabits the banks of mountain streams 29. *G. buckerveldii*
- Perianth tube shorter or about as long as the upper lobe, the lobes well-developed, flower red, orange, yellow and/or greenish in various combinations; widespread in the summer-rainfall region 11. *G. natalensis*
- dd* Perianth recurved, nodding, with a short tube and gaping campanulate limb; lower lateral lobes with an oblong dark area 12. *G. papilio*
- cc* Perianth up to 4.5(–5) cm long:
- Perianth erect, obliquely funnel-shaped with a narrow tube and erect, somewhat spreading lobes, pale pink, finely speckled and lined with red; leaves glaucous, coriaceous *c.* 18 mm broad with fine close-set nerves 13. *G. hollandii*
- Perianth narrowly bell-shaped, porrect:
- f* Plants glabrous:
- g* Anthers not tailed:
- h* Spikes up to 20-flowered, rarely with a basal branch, not elongating much during anthesis; upper buds secund:
- Leaves with a prominent margin and midrib, the areas in between closely and finely nerved; flowers pink; eastern Transvaal:
- Leaves long, linear; bracts thin, closely ribbed, the raised ribs whitish and the grooves speckled with rust-coloured, longish blotches; perianth plain when dry 3b. *G. varius* var. *micranthus*
- Leaves short, narrowly lanceolate; bracts firm, plain, smooth with hyaline margins; perianth spotted when dry 14. *G. exiguus*
- Leaves with several prominent secondary ribs beside the margin and midrib, the areas in between smooth; flowers cream, yellow or pink; eastern Cape ~~Transvaal~~ 9. *G. ochroleucus* var. *ochroleucus*
- hh* Spikes normally very long with 20–40 flowers in a double secund row, often with a short basal side

branch, elongating during anthesis and the lower flowers becoming more widely spaced; upper buds distichous:

Leaves sclerotic, yellowish green, linear with raised yellow ribs and margins; lower lateral lobes of perianth short with a broad dark blotch near the apex

15. *G. crassifolius*

Leaves leathery, glaucous, broadly linear, closely and finely nerved; lower lateral perianth lobes nearly as long as the central lobe with a yellow or dark medial line or blotch:

Perianth densely speckled with purple or pink spots and with a central yellow line on lower lobes

16. *G. densiflorus*

Perianth not speckled, pale mauve, white or pink with a small yellow or dark mauve blotch on central area of lower lobes

17. *G. invenustus*

gg Anthers tailed:

Perianth c. 4.5 cm long, campanulate, prognathous; the outer lobes encircling inner; bracts narrowly lanceolate-acuminate; leaves linear

18. *G. calcaratus*

Perianth c. 3.5 cm long, narrowly campanulate; bracts ovate, apiculate; leaves usually shortly ensiform (linear in var. *longifolius*)

19. *G. appendiculatus*

ff Plants hairy on all vegetative parts

20. *G. pole-evansii*

NB
→ var. *longifolius*
hairy

GROUP II. PAUCIFOLIATI

Leaves 2-5, distichously, subdistichously or spirally arranged, placed one above another on an elongated stem, often dissimilar in size and shape. (Note: depauperate specimens may produce fewer leaves; the Kalkoentjies, with their characteristic perianths, are included here although some species develop one long basal leaf with the following shorter.) Inflorescence often with one to few, basal side branches; flowers small to large, fairly regular to irregular, viz. bilabiate, hypognathous or prognathous. Found predominantly in the winter-rainfall region and the eastern Cape; including some Painted Ladies, the Kalkoentjies, etc.

a Perianth fairly regular, infundibuliform to salver-shaped, usually over 5 cm long (*G. stellatus* and *G. gueinzii* excepted) and with a well-developed tube; lobes fairly similar, the 3 lower free below, often somewhat smaller, white, pink or mauve with dark midribs or variously marked, occasionally with dark blotches in throat; including some of the 'Painted Ladies':

Stamens arranged in a circle around the style, erect; perianth small, star-shaped

21. *G. stellatus*

Stamens and style placed before the dorsal lobe, arched (occasionally in a circle around the style in *G. floribundus* but then flower tubular-campanulate and bigger; also in *G. gueinzii* but then a littoral psammophyte with linear succulent leaves):

Perianth about 3 cm long, the stamens arranged around the style or placed against the upper central lobe; a littoral psammophyte with linear succulent leaves; recorded from the southern and eastern beaches from the Cape to Natal

22. *G. gueinzii*

Perianth 3-10 cm long; inhabiting mountain slopes, flats or marshy areas:

b Leaves filiform, subulate to narrowly linear, 1-3 (rarely up to 4) mm broad:

c Perianth tube longer than limb:

Perianth tube narrowly tubular below, suddenly widened halfway; flower pale greenish yellow

23. *G. acuminatus*

Perianth tube tubular, gradually widening somewhat above; flowers pink, white or cream:

Spike several- to many-flowered; perianth white or cream; upper and lower lobes fairly similar in size; species found inland:

- Small plants *c.* 15 cm tall, with linear falcate leaves and short arcuate spikes bearing the many trumpet-shaped flowers in a close secund spray; lower lobes with red markings 24. *G. lapeirousioides*
- Tall plants *c.* 50 cm high, with straight filiform leaves and tall erect spikes; the flowers narrowly funnel-shaped, cream with a dark midrib 25. *G. leptosiphon*
- Spike 1-3 flowered; perianth pink with lower lobes about half as large as upper; corm with hard pectinate tunics 26. *G. vigilans*
- cc* Perianth tube equalling the limb, pink, the corm with soft tunics 31. *G. carneus*
- bb* Leaves linear-lanceolate to ensiform, over 4 mm broad:
- Summer-rainfall species:
- Leaves *c.* 5 mm broad, glabrous with a midrib but without distinct secondary nerves; perianth salmon pink; eastern Transvaal 27. *G. macneilii*
- Leaves *c.* 1 cm broad, with minute hairs on raised midrib and secondary nerves; perianth mauvy pink; Natal Drakensberg 28. *G. microcarpus*
- Winter-rainfall species (extending eastwards as far as Port Elizabeth):
- d* Plants glabrous:
- Spikes densely *c.* 30-flowered, secund; perianth tube long, lobes small, narrow, with the lower much reduced; endemic on the Cedarberg 29. *G. buckerveldii*
- Spikes laxly 1-15-flowered; flowers better proportioned; more widespread:
- Perianth lobes acute:
- Perianth tube longer than limb, white or cream with red markings on lower lobes 30. *G. angustus*
- Perianth tube about as long as limb:
- Spike erect, straight, usually distichous; lower perianth lobes with markings on lower lobes (rarely immaculate); species variable 31. *G. carneus*
- Spike bent to distinctly arched, usually secund; perianth lobes with a darker midrib (rarely with markings on lower lobes, cf. *spp. rudis*) 32. *G. floribundus*
- Perianth lobes long acuminate 33. *G. undulatus*
- dd* Plants hirsute:
- Basal leaves short, lanceolate, usually *c.* 15 cm long and 1,5 cm wide; perianth old rose, strongly scented at night; corms with hard tunics splitting into wiry fibres (western Cape) 34. *G. caryophyllaceus*
- Basal leaves linear about 60 cm long and 1 cm wide; perianth creamy white, flushed with deep pink outside and a dark midrib, not scented; corms with soft tunics; only recorded from the Ladismith district, Cape 35. *G. lewisiae*
- aa* Perianth bilabiate, *c.* 3-8 cm long, the upper lobes usually hooded, the lower connate at the base with the laterals placed above the lowest, prognathous or hypognathous:
- e* Perianth lobes of upper lip fairly similar in shape apart from differences in size; those of lower lip also fairly similar to one another, narrower than upper, usually clawed and often forming a gap behind the lips when viewed sideways:
- Upper central lobe shorter and narrower than lateral upper lobes; lowest lobe much longer than lower side lobes 36. *G. involutus* *Cape*
- Upper central lobe longer and usually broader than upper side lobes; lowest lobe equalling the laterals or somewhat longer or shorter:
- f* Leaves soft, flat, linear to linear-lanceolate, straight or falcate; inflorescence often branched, bent sideways with

the rhachis 'scalloped' or curved between two second flowers which with their bracts are placed at right angles to rhachis:

Lower perianth lobes geniculate at the base of the blades which curve sharply downwards, their claws canaliculate with the sides turned up

Lower perianth lobes in line with tube or gradually curved downwards; claws flat; leaves often falcate, usually fairly short:

Leaves minutely pubescent below, about 2-4 mm broad; perianth lobes with short claws or merely attenuated

Leaves glabrous, 10-15 mm broad; perianth lobes with narrowly ovate-acuminate blades and long flat claws

ff Leaves usually hard, quadrangular to cruciform in cross-section, and often abruptly narrowed above sheathing part; inflorescence erect, simple or occasionally branched, rarely scape somewhat curved and rhachis flexuose; bracts hugging rhachis:

Bracts without red margins, rhachis glabrous:

g Leaves glabrous:

Seed winged:

Perianth *c.* 4 cm long, mauve, finely speckled all over with small violet dots; lobes rounded, minutely apiculate; confined to the Kamiesberg . . .

Perianth about 2-3 cm long, plain, the tips of the lobes acute to caudate:

Spike few to many flowered; flowers white, cream to brownish, rarely pale pink or mauve; lobes acute to caudate; bracts not distinctly red-veined; widespread

Spike many-flowered with the pink flowers imbricate; lobes obtuse-apiculate; bracts distinctly red-veined; eastern Transvaal

Seed not winged; species confined to the Pretoria district

gg Leaves with long soft silky hairs:

Plants up to 90 cm tall; perianth about 4 cm long; Cape

Plants up to 25 cm tall; perianth about 3 cm long; Cape

Bracts with red margins, rhachis pubescent; flowers speckled; endemic in the eastern Transvaal

ee Perianth lobes dissimilar with the limb often 'long-faced', gaping; dorsal lobe erect or hooded; upper laterals rhomboid with dark veining; lower narrow, often unequal with the colour pattern straight across the blades; stamens and style exposed, arched; winter-rainfall region with one species extending somewhat further north. Kalkoentjies:

h Perianth in various, usually dull colour combinations of grey, green, brown, mauve, purple, pink and yellow:

i Dorsal perianth lobe remaining hooded when in full flower:

Dorsal perianth lobe linear spatulate, long clawed, much narrower than upper laterals; leaves 4-5 fairly similar, distichous, glabrous, straight or falcate

Dorsal perianth lobe lanceolate with a transparent area along the margin above, about as broad as the laterals; basal leaf longer than

37. *G. scullyi*

38. *G. arcuatus*

39. *G. salteri*

40. *G. kamiesbergensis*

41. *G. permeabilis*

42. *G. vernus*

43. *G. pretoriensis*

44. *G. marlothii*

45. *G. mostertiae*

46. *G. rufomarginatus*

47. *G. orchidiflorus*

- two above it, with raised, minutely hispidulous close-set veins 48. *G. watermeyeri*
- ii Dorsal perianth lobe erect when in full flower with the blades often reflexed:
 Basal leaf erect, terete to subulate or narrowly linear often overtopping spike; cormlets sessile:
 Corm with fibrous tunics; cormlets globose; uppermost leaf separate from leaf below it, exposing the internode 49. *G. virescens*
 Corm with hard matted tunics extending into a neck; cormlets spindle-shaped, black and shiny; uppermost leaf emerging from sheath of leaf below it, with no visible internode 50. *G. ceresianus*
 Basal leaf falcate, flat, about as long as spike; cormlets on long stolons 51. *G. uysiae*
- hh Perianth red, orange or old rose with bright yellow and green markings on lower lobes; dorsal lobe hooded or semi-erect, fairly wide:
 Stamens and style usually pubescent; basal leaf up to 2 cm wide, without a red margin 52. *G. alatus*
 Stamens and style glabrous; basal leaf usually more than 2 cm wide, with a red margin 53. *G. equitans*

GROUP III. UNIFOLIATI

Plants with one long basal leaf at anthesis which is usually narrowly linear to subulate, often ribbed, the tip occasionally spinescent; the following 2-3 leaves much reduced, bract-like, sheathing the scape, usually with free tips. (Exceptions are *G. bullatus*, one of the Bells, where the basal leaf remains short and early flowering individuals where the development of the leaf has lagged behind.) Inflorescence simple, very rarely with a basal branch, one to few to several flowered; flowers small to large, fairly regular to bilabiate and then often prognathous. Corms hard and clawed or fibrous, usually small. Found predominantly in the winter-rainfall region, usually flowering in spring. (Note: In *G. gracilis* and some related species some plants will flower from May onwards; *G. tristis* var. *aestivalis* flowers in December.) Included are the Aandblomme or Evening Flowers, Pypies, Afrikaners, Bells and a Painted Lady.

- a Perianth fairly regular, funnel-shaped to trumpet-shaped, the tube occasionally very long:
 Stamens and style erect, symmetrically arranged around the style:
 Perianth orange-red, small; bracts short, somewhat inflated, gaping, acute or obtuse; plants inhabiting mountain slopes 54. *G. brevityubus*
 Perianth white, pink, mauve or yellow and maroon; bracts narrowly lanceolate-acuminate, closely ribbed; plants inhabiting vleis:
 Flower white, pink or pale mauve, about 2 cm long 55. *G. quadrangulus*
 Flower yellow with a dark maroon throat, about 5 cm long 56. *G. citrinus*
 Stamens and style arched, placed before dorsal lobe:
- b Perianth tube straight or nearly so:
 c Flowers funnel-shaped:
 Perianth yellow, suffused with mauve; lower lobes with dark streaks; usually growing in marshy places 57. *G. tenellus*
 Perianth white, pink or mauve; lower lobes with small pink or violet edged yellow diamond-shaped marks or merely with dark blotches; found in rock crevices at high altitudes:
 Uppermost bract (reduced leaf) similar to, but smaller than the leaves below it, with a free pointed tip; lowest leaf about 5 mm wide; flowering in December 58. *G. oreocharis*
 Uppermost bract (reduced leaf) reduced to a small sheath without a free tip; lowest leaf about 2 mm wide; flowering September-October 78. *G. inflatus* var. *louiseae*
- cc Flowers salver-shaped, white pink or mauve, resembling those of *Lapeirousia*:
 Corm tunics soft, fibrous; perianth tube longer than lobes:
 Summer-rainfall region: leaves linear, soft 59. *G. robertsoniae*

- Winter-rainfall region; leaves cruciform in cross-section, sclerotic with prominent ribs 60. *G. cylindraceus*
- Corm tunics hard, clawed (soft in var. *debilis*); perianth tube shorter than lobes which are white or pink with red hastate or other distinct markings on lower lobes (Painted Lady); south-western Cape 61. *G. debilis*
- bb Perianth tube curved, flower facing sideways (occasionally fairly straight in *G. longicollis* var. *platypetalus* but then tube very long):
- d Plants glabrous:
- e Flowers scented in the evening when they open fully; perianth cream, yellow, brown or purple in various combinations or plain; Aandblomme, Evening Flowers, Afrikaners:
- Perianth tube tubular, slightly widened above with a slight constriction at the throat; summer-rainfall region 62. *G. longicollis*
- Perianth tube narrowly funnel-shaped; winter-rainfall region:
- Perianth lobes with short acute tips; spikes 3-10-flowered; bracts obtuse to acute; perianth cream to yellow with dark medial lines 63. *G. tristis*
- Perianth lobes with long tapering recurved tips; spikes 1-3-flowered; bracts acuminate; perianth dark brown to maroon 64. *G. liliaceus*
- ee Flowers open during the day, scented or scentless (*G. hyalinus* is occasionally scented in the evening); perianth variously coloured:
- Flowers dark coloured, variously streaked and spotted, brown, purple, mauve, yellow, grey and green often with hyaline areas:
- Perianth lobes with short acute or obtuse tips; tube enclosed in obtuse sheathing bracts 65. *G. hyalinus*
- Perianth lobes with long tapering recurved tips; tube exerted laterally from acuminate bracts near the middle 66. *G. recurvus*
- Flowers pink to mauve; a montane species endemic in Natal 67. *G. symonsii*
- dd Plants pubescent 68. *G. punctulatus*
- aa Perianth zygomorphic, bilabiate, usually prognathous; tube curved, usually shorter than limb; lower lobes variously marked; scape bent outwards at base of spike; winter-rainfall region; Pypies and Bells:
- f Perianth narrowly funnel-shaped (occasionally somewhat inflated in *G. ornatus*) lower lobes spreading to recurved, the central lower lobe usually longest (Pypies):
- Sheath at base of scape spotted:
- Corms with thin fibrous tunics; perianth mauve, yellow or brown, in various combinations; limb usually somewhat closed 69. *G. carinatus*
- Corms with hard woody, clawed tunics; perianth green, the lower lobes with a transverse yellow band; limb somewhat gaping 70. *G. viridiflorus*
- Sheath at base of scape not spotted (occasionally spotted in *G. rogersii* but then perianth inflated):
- g Flowers pink; leaf margin smooth:
- Corms with hard, woody, clawed tunics; reduced cauline leaves 4; bracts conspicuously and closely ribbed; lower lobes streaked with dark red on a yellow base; scent faint, unpleasant 71. *G. blommesteinii*
- Corms with soft, papery tunics; reduced cauline leaves 3; bracts not conspicuously ribbed; lower lobes with a hastate or diamond-shaped mark; not scented 72. *G. ornatus*

- gg* Flowers mauve, blue, pink, white or yellow, sweet scented; leaf margin scabridulous or smooth:
 Corm hard, clawed, woody; lowest leaf often minutely scabridulous on the nerves, limb somewhat closed 73. *G. gracilis*
 Corm fibrous often produced into a neck; lowest leaf with smooth nerves:
 Plants from mountains around Worcester, flowering May; limb somewhat gaping 74. *G. exilis*
 Plants from south eastern Cape coastal districts (Riversdale to Albany), flowering July to August; limb somewhat closed 75. *G. mutabilis*
ggg Flowers mauve striped with violet, upper lobes ovate acuminate; leaf blade 3-winged with midrib projected dorsally 76. *G. violaceo-lineatus*
gggg Flowers buttercup yellow, lobes narrow, tapered; leaf blade linear or subulate, occasionally minutely hispidulous below 77. *G. comptonii*
ff Perianth inflated, bell-shaped, the lobes straight, only the tips occasionally recurved, the outer lower lobes longer than central or equalling it (Bells):
 Leaves glabrous:
 Bract obtuse to acute, not distinctly ribbed; spikes one to many flowered; corms hard or soft:
 Perianth with 3 lower lobes about equal in size; corm with hard woody claws; flower usually pink rarely mauve or white; spike 1-4-flowered; inland montane species 78. *G. inflatus*
 Perianth with lower lateral lobes longer than central; corm fibrous; flower blue or purple; spike usually many flowered; a coastal species found in Restio veld, rarely somewhat further inland 79. *G. rogersii*
 Bract long acuminate, closely ribbed; spike with 1-2 pendulous much inflated flowers; corm hard, clawed 80. *G. bullatus*
 Leaves hairy with long silky hairs; flower yellow 81. *G. pritzelii*

GROUP IV. EXFOLIATI

Free basal leaf or leaves absent at time of flowering, developing later from a separate bud, 1-2 to several forming a distichous fan; spikes bearing cauline sheathing bracts, viz. reduced leaves; plants flowering in autumn, February-July, in the winter-rainfall region or in spring, August-December, in the summer-rainfall region. Note: *G. jonquilliodorus* flowers from the end of December to February. *G. maculatus*, *G. guthriei* and *G. odoratus* flower somewhat later (April-July) and the leaves on the scape are less bract-like than is usually the case in the other species.

a Cape winter-rainfall species:

- b* Perianth funnel-shaped to trumpet-shaped with a spreading limb, usually fairly regular, 5 cm or more long:

c Flowers red or scarlet (if pink with a gold-flecked sheen):

- Lower lobes with a broad white central medial line; flower widely funnel-shaped with large spreading lobes 82. *G. stefaniae*

Lower lobes plain red without a white midrib:

- Perianth lobes rounded with the margins incurved; flowers porrect 83. *G. stokoei*

- Perianth lobes narrowly oblong, margins straight; flowers erect, gold flecked, somewhat resembling *Nerine sarniensis*, occasionally pink 84. *G. nerineoides*

cc Flowers in various shades of pink:

- Lower cauline bracts leaf-like, fairly well developed, pilose; flowers dark old rose; tube short, curved 85. *G. guthriei*

- Lower cauline bracts small, glabrous; flowers pink to pale pink, very rarely white; tube well developed to long:
- Perianth tube straight, funnel-shaped about as long as or shorter than the lobes; hysteranthous leaves 1-3, linear, *c.* 2 cm broad, laxly falcate, spreading, glaucous; endemic on cliffs around Hermanus (an albino form has been recorded) 86. *G. carmineus*
- Perianth tube curved, tubular to cylindrical nearly to the throat, usually longer than the lobes; 'hysteranthous' leaf, filiform, erect;
- Perianth tube narrowly tubular, *c.* 3 mm wide at the throat; flower pale pink with hastate red marks on lower lobes; endemic on Table Mountain 87. *G. monticola*
- Perianth tube cylindrical in upper half, *c.* 1 cm in diam.; flower pink with carmine spotting in throat and on the base of lower lobes; south-eastern Cape 88. *G. maculatus* ssp. *meridionalis*
- ccc Flowers white, cream or pale yellow; tube well developed, thin:
- Flowers delicate, *Lapeirousia*-like, up to 6 cm long; white with a single red line on 3 lower and upper laterals 89. *G. engysiphon*
- Flowers firmer, up to 8 cm long:
- Lower perianth lobes with 2 fine pink parallel median lines 90. *G. bilineatus*
- Lower perianth lobes plain or occasionally mottled or streaked in the throat; perianth white to pale yellow 88. *G. maculatus* ssp. *eburneus*
- ccc Flowers brown, red or maroon, speckled and streaked with yellow or white:
- Perianth lobes more or less equal in width; 'hysteranthous' leaf filiform to linear:
- Perianth tube about as long as the lobes or somewhat shorter; lobes *c.* 2 cm wide, acute to long tapered, undulate 88. *G. maculatus* ssp. *maculatus*, *hibernus*
- Perianth tube longer than the lobes which are *c.* 1 cm wide and obtuse or acute 91. *G. emiliae*
- Perianth with the upper lobe about twice as wide as the others; 'hysteranthous' leaf lanceolate-ensiform, pilose 92. *G. odoratus*
- bb Perianth bilabiate, prognathous, usually small, 3-5 cm long with the lower lobes variously spotted or striped; spike secund, few to many-flowered with 2-3 bracts (viz. reduced leaves) sheathing the scape:
- Basal cauline bract long, sheathing stem nearly to the top, second (the uppermost) bract much reduced; flower resembling that of *G. gracilis* 93. *G. vaginatus*
- Basal cauline bract short, fairly similar in size to one above it, evenly spaced along scape leaving internodes exposed:
- d With one basal 'hysteranthous' leaf; flower pink, mauve or greyish, not yellow:
- Basal 'hysteranthous' leaf flat, linear, ribbed, sparsely hairy 94. *G. brevifolius*
- Basal 'hysteranthous' leaf terete, grooved, glabrous or sparsely hairy:
- Perianth lobes lanceolate, acute; flowers sweetly scented, variously coloured; corm globose, *c.* 2 cm in diam. with fine reticulate fibres, not forming a neck; 'hysteranthous' leaf glabrous 95. *G. pillansii*
- Perianth lobes ovate, obtuse; flowers scentless:
- Flower white or pale pink with yellow or red markings on lower lobes; corm ovoid with thin brown tunics, not forming a neck; 'hysteranthous' leaf glabrous 96. *G. martleyi*
- Flower pale blue or mauve with yellow markings on lower lobes; corm top-shaped with dark coarse fibres

- stretching up into a neck; 'hysteranthous' leaf with 4 shallow hairy grooves 97. *G. subcaeruleus*
- dd With 2 basal, terete 'hysteranthous' leaves; flowers cream or yellow, sweetly scented; occasionally flowering at end of December 98. *G. jonquilliodorus*
- aa Summer-rainfall species:
- Flower about 8 cm long, resembling that of *Homoglossum*, orange to yellow; spikes up to 80 cm tall, many flowered, distichous; 'hysteranthous' leaves about 6 arranged in a fan 99. *G. aurantiacus*
- Flower 2-5 cm long, tubular campanulate to bilabiate; 'hysteranthous' leaves 1-3:
- Plants glabrous:
- Flower about 5 cm long, more or less tubular-campanulate, pink to mauve; eastern Lowveld 100. *G. brachyphyllus*
- Flower about 3 cm long, bilabiate, prognathous, pale white to mauve with dark transverse bands on clawed lower lateral lobes; western Transvaal to tropics 101. *G. unguiculatus*
- Plants hairy:
- Flower about 3 cm long, bilabiate, purple, brown or yellow with 3-5 short sheathing bracts 102. *G. woodii*
- Flower about 2 cm long, fairly regular, mauve, white or pink; with a long tubular, leaf-like sheathing bract and a minute apical one below spike 103. *G. parvulus*

1914. 3. parvulus 25. 1914

Curtis

1. **Gladiolus cardinalis** Curt. in Curtis's bot. Mag. t.135 (1790); Schneev., Ic. t.27 (1793); Salisb., Prodr. 40 (1796); Red., Lil. t.112 (1805); Vahl, Enum. **2** : 92 (1806); Ait. f., Hort. Kew. ed. 2, **1** : 102 (1810); Poir. in Lam., Encyc. Suppl. **2** : 787 (1812); Spreng., Syst. **1** : 153 (1825); Ker. Gen. Irid. 143 (1827); Bak., Handb. Irid. 219 (1892), Fl. Cap. **6** : 156 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 215 (1893); Marloth, Fl. S. Afr. **4** : t.46c et figs 49b, c (1915); L. Bolus, Barclay & Steer's Second Bk S. Afr. Flowers t.150 (1936). Type: Cape, Curtis's bot. Mag. t.135 (iconotype); described and painted from a plant flowering in the nursery of Grimwood & Co. who had obtained the corms from Holland. *G. speciosus* Eckl., Top. Verz. 41 (1827), nom nud.; non Thunb. 1811.

Common names: Waterfall Gladiolus; New Year Lily; Nuwejaarsblom.

Corm subglobose, 1,5–3 cm diam., the tunics soft, brown, submembranous, often disintegrated at flowering time. *Stem* stoutish, usually simple, 60–115 cm long, more or less declinate above the middle, with 2–3 basal sheaths, the 1–2 outer obtuse to acute, brownish, hyaline or occasionally green, 6–21 cm long, the inner up to 30 cm, subacute to acuminate. *Leaves* 5–9, subglaucous, the 3–6 lower 40–90 cm long, usually with fairly long sheaths, occasionally purplish mottled with green near the base, and ensiform or lanceolate blades 1,5–2,8 cm wide, somewhat flaccid, several-veined, the midrib and 1–2 others fairly prominent; cauline shorter than basal, the uppermost 6,5–15 cm long, lanceolate, conduplicate, not or very little sheathing. *Spike* secund, closely 5–12-flowered, the flowers turned towards the stem apex. *Bract* lanceolate to oblong-lanceolate, acuminate or acute, subcarinate, 3,5–8,5 cm long; bracteole shorter, acute, subacute or minutely bifid at the apex. *Flowers* large, scarlet or crimson, the 3 lower lobes with a largish white or cream somewhat rhomboid or diamond-shaped mark with a pinkish mauve border merging into deeper red, sometimes 1 or both of the upper lateral lobes with a similar or modified marking. *Perianth tube* slightly curved and twisted, 3–4 cm long, the upper half funnel-shaped; *lobes* acute, subacute or more often obtuse, sometimes retuse, the dorsal slightly hooded and porrect and others patent; 3 upper ovate-oblong, 4–5,5 cm long, the dorsal 2–3 cm wide and laterals 1,8–2 cm; 3 lower oblong, elliptic or somewhat oblong-spathulate, 3,5–4,8 cm long, connate for 5–6 mm, 1,3–1,7 cm wide, the lowest slightly longer than laterals. *Stamens* arcuate, arising 1–1,3 cm below top of tube; filaments 2,5–4 cm long; anthers linear, subsagittate, 0,9–1,4 cm long. *Ovary* oblong, 6–7 mm long; style reaching to base or top of anthers, with oblanceolate conduplicate branches 0,8–1 cm long.

Confined to the south-western Cape where it is rather rare in the mountains of the Paarl, Wellington and Worcester districts, hanging over cliffs besides streams or on moist rocky ledges, up to 1 400 m alt., flowering in midsummer from December to January.

COLOUR PLATE 1. FAY ANDERSON.—Top of pendulous flower spike; corm showing old corms with active roots; habitat sketch.

Cape.—Worcester: waterfall on Krom River, Dutoitskloof, *Oliver*. December 1965.

CAPE.—Paarl: French Hoek, *A. Bolus* in Herb. *Guthrie* 4558 (BOL), *Marloth* 5314 (PRE); Haalsneekop, *Stokoe* (SAM 56194, (PRE); Haalhoek Spitskop, *Esterhuysen* 13533 (BOL, PRE). Wellington: waterfall near Wellington, *MacOwan* 3201 (SAM); Baviaanskloof, *Van Breda* 906 (PRE). Worcester: Bain's Kloof, *Heatley* in Herb. Moss 5091 (BM), *Kies* (PRE); Dutoitskloof, *Drège* (P, S), *Bolus* 5117 (BOL), *Loubser* 867 (NBG); Krom River off Dutoitskloof, *Jones* (NBG); Waaihoek, *Wasserfall* 823 (NBG), *Esterhuysen* 9930, 22622 (BOL); Brandwag Mts, *Topper* 431 (NBG).

WITHOUT LOCALITY: *Drège* (BM, CGE, G, L); *Masson* (BM—Hoek Mts. ? French Hoek); *Persoon* (L); *Willdenow* no. 935 (B).

Flowering in midsummer, this is one of the most spectacular species of the south-western Cape Province and was one of the earliest to be introduced into cultivation in Europe, where it was used to produce hybrids with *G. tristis* and other species. One of the best known of these early hybrids, *x G. colvillei*, named after the London nurseryman who first introduced them to popularity, is still grown and popular today. A beautiful plate of this hybrid, t.1993 in *Flores des Serres* ed. 2 (1873) clearly shows its hybrid vigour and the dominance of the *cardinalis* parent.

Fifty years ago Marloth remarked of *G. cardinalis* that 'owing to the continuous gathering of its bulbs by amateurs and seedsmen it has become rather rare in its natural habitat. The gathering of its bulbs or flowers is now prohibited.' Thanks to this restriction the species has managed to survive but it is by no means as plentiful as it once was.

In its natural environment the plant usually grows in a sprawling position on moist rocky cliffs, with the stem curved down towards a mountain pool or stream but the flowers erect and facing towards the apex of the spike due to a half twist in the perianth-tube. Marloth demonstrated that this inverted position of the flower is not a fixed character but an adjustment to enable the flower to assume a position most suitable to the visiting pollinating agents such as sunbirds and insects (*Flora of South Africa* vol. 4, figs 49b and c). Baker described the spike as 12–20-flowered but this is unusual, the normal number of flowers being five to twelve.

Ecklon collected the species in the mountains around Drakenstein in January 1826, naming it *G. speciosus* and mentioning in his *Topographisches Verzeichniss* 41 (1827) that it was one of the finest species with its deep red flowers and that it was called 'Caapsch Nuwejaars Afrikaner'.

2. *Gladiolus sempervirens* Lewis, nom. nov.

G. splendens Bak. in J. Bot., Lond. **14** : 333 (1876), Handb. Irid. 219 (1892), Fl. Cap. **6** : 156 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 224 (1893); non Herbert 1843. Type: Cape, George district, mountains near Oakhurst, *Dumbleton* (K, holo.).

Common names: Kliplelie, Bergpypie, Bergafrikaner.

Corm small, subglobose, 1–1.5 cm diam., somewhat rhizomatic, partly enclosed in dark brown bases of outer basal leaves, with a well-developed root-stock; several short slender rhizomes usually present. *Stem* usually simple, moderately slender, 40–50 cm long, enclosed in leaves nearly to spike, sub-declinate above; basal sheaths present on young shoots but not on flowering stems. *Leaves* 9–16, usually evergreen, distichous, lanceolate or ensiform, the basal up to 30 cm long, 1–2 cm wide, the 2–3 outer shorter, narrower and more or less brown at flowering time, soft to fairly firm with the midrib and 2–3 other veins clearly visible but not prominent; lower cauline like basal, becoming shorter and the 2 upper 11–15 cm long, lanceolate, conduplicate. *Spike* secund rather laxly 4–8-flowered, the flowers turned towards the stem apex. *Bract* lanceolate, acuminate, 6.5–4 cm long; bracteole shorter and broader than bract, obscurely bidentate. *Flowers* large, up to 12 cm long, bright scarlet with a white dagger-shaped mark in lower half of 3 lower lobes. *Perianth tube* curved and slightly twisted, 2.5–5 cm long, the upper third rather narrowly funnel-shaped; *lobes* acute, the dorsal porrect, not hooded, and others patent, narrowed to the base and sometimes subunguiculate; 3 upper 5–6.5 cm long, 2.5–3.3 cm wide, broadly elliptic or the dorsal more or less obovate-elliptic and laterals ovate-elliptic and usually slightly wider than the dorsal; 3 lower more or less elliptic, 5–5.5 cm long, connate for 3–4 mm, 1.8–2.5 cm wide, the lowest slightly larger than laterals. *Stamens* arcuate, arising 0.6–1 cm below top of tube; filaments 2.8–4.2 cm long; anthers linear, subsagittate, 1.2–1.4 cm long. *Ovary* oblong, 0.8–1 cm long; style reaching above middle of anthers, with spatulate or oblanceolate conduplicate branches 8 mm long. *Capsule* unknown.

Recorded from the Cape Province in the George, Knysna, Uniondale and Humansdorp districts in the mountain forests, sometimes locally common in kloofs and on rocky ledges from 400 to 1 700 m alt., flowering from February to April.

COLOUR PLATE 2. G. J. LEWIS. — Inflorescence; corm and base of leaves showing beaded rhizomes; stamens; top of style and stigmas; bract; bracteole.

Cape.—George: Witfontein, *Pienaar* (NBG 76782) Flowered Kirstenbosch. February 1964.

CAPE.—George: mountains near Oakhurst, *Dumbleton* (K); George, *Van Breda* 917 (K, PRE), *Herre* (BOL); Witfontein, Outeniqua Mts., *Pienaar*, NBG 169/63 (NBG), Biervlei Plantation, *Morze* 2064 (NBG). Humansdorp: Witte Els Berg, *Fourcade* 2539 (BOL), 2967 (BOL, K, PRE), NBG 1143/22 (BOL), near Shepherd's Bush, *Tsitsikamma*, *Batten* (NBG). Knysna: Millwood, *Duthie* 907 (BOL); Plettenberg Bay, *Smart* in herb. Rogers 26692 (K, Z); Knysna Forest, E.S.C.A. Herb. 432 (G, L, Z). Uniondale: Formosa, *Compton* 4204 (BOL); Kompanies Berg, Langkloof, *Armer* 30 (NBG); north side of Tsitsikamma Mts., near Joubertina, *Esterhuysen* 18352, 22806 (BOL).

This fine species is allied to *G. cardinalis*, with much the same type of habitat though further to the east, and similar large red flowers marked with white on the three lower lobes, but is distinguished by some very definite characters in the corm and leaves. Its corm is smaller than that of *G. cardinalis* and more in the nature of a rhizome. It has no short outer tunics but is partly enclosed

in the brown bases of the lower basal leaves arising from regularly spaced nodes, and has a very well developed root-stock on which the plant must largely depend for its water and other supplies. It also gives rise to two or three short slender beaded rhizomes from which new shoots are produced.

The leaves somewhat resemble those of *G. cardinalis* in shape and texture but are shorter, with little or no sheath at the base, and unlike those of *G. cardinalis* and almost all other species in the genus, they are persistent. This fact was first recorded by Mr W. Pienaar, Government Forest Officer at Witfontein in the George district, who sent young plants to the National Botanic Gardens, Kirstenbosch, in 1962. These plants remained evergreen and flowered the following year when the illustration reproduced here was prepared. The flowers are a deeper red than in *G. cardinalis*, with rather smaller white markings, the lobes usually larger and more acute, and the dorsal lobe is not at all hooded.

Baker's name for the species cannot be upheld, having previously been used for another South African plant [now *Anomalesia splendens* (Sweet) N.E. Br.], and as a new name is required, the epithet *sempervirens* was chosen on account of the very unusual nature of the leaves. According to a note on specimens collected by Van Breda, the common name for the species in the George district is Klipelelie.

3. **Gladiolus cruentus**^{S.} Moore in Gard. Chron. 1868 : 1139 (1868); Hook. f. in Curtis's bot. Mag. t.5810 (1869); Bak., Handb. Irid. 219 (1892), Fl. Cap. 6 : 157 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 216 (1893). Type: Curtis's bot. Mag. t.5810 (iconotype).

G. flanaganii Bak. in Fl. Cap. 6 : 530 (1897). Type: Lesotho, Mont-aux-Sources, near summit, *Flanagan* 1832 (BOL, holo., PRE).

Corm large, globose (fide Baker). *Stem* simple, stout or moderately stout, 30–90 cm long, straight or more or less curved. *Leaves* 4–5, distichous, the 3–4 lower 20–45 cm long, $\frac{1}{3}$ – $\frac{1}{2}$ sheathing with ensiform or linear-ensiform blades 1,1–2,5 cm wide, several-veined with the margins, midrib and 2 or 3 veins slightly prominent, glabrous or minutely pubescent. *Spike* secund or distichous, 3–10-flowered. *Bract* lanceolate, oblong-lanceolate or narrow-oblong, acuminate to obtuse, green, sometimes tinged with red, usually 4–7 cm long (lowest sometimes 7–15 cm according to Baker); bracteole shorter than bract, bifid at apex. *Flowers* large, more or less broadly campanulate above the tube, scarlet, the tube pale outside, yellowish white mottled with red in the throat, and lower lateral lobes with an irregular white and red mottled band near middle with a white dagger-like mark projecting from centre towards the apex. *Perianth tube* 3,5–4 cm long, slightly curved, funnel-shaped in upper half; *lobes* patent, subequal or 3 lower slightly smaller than upper, all obtuse, sometimes retuse, mucronulate, obovate or obovate-spathulate, 3–5 cm long, 1,8–3 cm wide. *Stamens* suberect, arising near middle of tube; filaments about 3–3,5 cm long; anthers linear, subsagittate, 1–1,5 cm long. *Ovary* rotund,

6–8 mm long; style reaching about middle of anthers, with spatulate branches 5–6 mm long.

Endemic on the Drakensberg summit around the Mont-aux-Sources and nearby peaks, where it is occasional on cliff faces or stony grassy places at altitudes of 2 300–3 300 m, flowering in December–January.

LESOTHO.—Mont-aux-Sources: near the summit, *Flanagan* 1862 (BOL, holo., PRE).

ORANGE FREE STATE.—Harrismith: Witsieshoek, Mopeli's Peak, *Thode* 6333 (STE). Mont-aux-Sources: *Thode* 8445 (STE).

NATAL.—Bergville: Royal Natal National Park, Mont-aux-Sources, *Trauseld* 150 (PRE); Cathedral Peak Forest Station, *Killick* 1859 (PRE). Estcourt: Giant's Castle, *Symons* 263 (BOL) TRV 25315 (PRE), *Trauseld* 306 (PRE).

WITHOUT LOCALITY.—*Barber* 326 (K).

G. saundersii fide H. & B.

Moore described *G. cruentus* in 1868 from a plant grown in London, received from Natal by Mr Bull of Chelsea, and the following year it was figured in *Curtis's Botanical Magazine*, with a description by Hooker f. There is no type specimen in Kew Herbarium nor the British Museum so presumably it was not preserved, and the figure in *Curtis's Botanical Magazine* must be taken as the type. Possibly it was required for breeding purposes as this very handsome species is one of the parents of some of the large red hybrids.

The type of *G. flanaganii* Bak., described nearly thirty years later from a specimen collected near the summit of the Drakensberg two years previously by Flanagan, is in the Bolus Herbarium. This is a considerably smaller plant than the cultivated type of *G. cruentus*, with shorter and firmer leaves—described by Baker as glabrous but actually pubescent when viewed with a lens—shorter bracts and fewer and smaller flowers, but the flowers are the same as in *G. cruentus*, with wide rounded lobes more or less equal in size and not reflexed, and there can be no doubt that it represents a more common form of the same species. It occurs only at high altitudes on the Drakensberg, mostly in inaccessible crevices on rocky cliff faces, for which reason it has been called the 'Suicide Gladiolus'. Plants growing in this position have the stem more or less curved and the spike secund, with the flowers turned towards the stem apex, as in the closely allied *G. cardinalis* of the western Cape Province. The plant figured as *G. cruentus* in *Flowering Plants of South Africa* (t.182) is the more common and widespread *G. saundersii*.

4. **Gladiolus saundersii** Hook. f. in *Curtis's bot. Mag.* t.5873 (1870); Bak. in *J. Linn Soc.* **16** : 176 (1877), *Handb. Irid.* 220 (1892), *Fl. Cap.* **6** : 158 (1896); Dur. & Schinz, *Consp. Fl. Afr.* **5** : 224 (1893); Wood, *Natal Pl.* **4**, t.342 (1904); Phill. in *Ann. S. Afr. Mus.* **16** : 282 (1917); De Smidt, *Flrs by the Roadside*, t.1 (1947), *Trauseld, Wild Flowers of the Drakensberg* 47 (1969). Type: Cape, Herschel district, summit of the Witteberge, *Cooper* 605 (K, holo., BM, Z).

G. saundersii and *G. saundersonii* Hort. ex Vilmorin's *Blumeng.* ed. 3; Sieb. & Voss **1** : 994 (1895) in syn. *G. cruentus* sensu Pole Evans in *Flower. Pl. S. Afr.*

t.182 (1925); non Moore 1868.

G. spectabilis Bak. in Bull. Herb. Boiss. ser. 2, 4 : 1006 (1904). Type: Lesotho, Maluti Mountains, Mt. Machache, about 32 km E. of Maseru, *Junod* 1927 (Z, holo., G, PRE, photo.).

Corm subglobose, 2.5–4 cm diam., with soft submembranous reddish brown tunics. *Stem* stout or moderately stout, straight, usually simple, 40–90 cm high, with 2 basal sheaths, the outer orange, more or less membranous, often partly disintegrated, 3–6 cm long, inner up to 20 cm, firm, orange below, brownish above. *Leaves* 7–8, distichous, suberect, the 4–5 basal lanceolate or ensiform, 25–60 cm long, 0.6–2.6 cm wide, several-veined, usually firm with the margins and midrib slightly prominent and stramineous and 2–4 other veins slightly raised; upper cauline much shorter, with short acuminate blades. *Spike* secund, laxly 3–8-flowered (rarely up to 12). *Bract* lanceolate, acuminate, 8–4.5 cm long; bracteole slightly shorter, obscurely bidentate or with 2 short setaceous teeth. *Flowers* large, more or less deflexed with the dorsal lobe suberect or projecting forward, usually somewhat concave, the other 5 closely imbricating and forming a broad semicircular recurved lip, sometimes the upper laterals patent and only 3 lower recurved, scarlet, bright vermilion or salmon-red with lower half of 3 lower lobes white or cream—sometimes with a spike-like point projecting from centre towards apex on the laterals—speckled with red round edges and down to the throat. *Perianth tube* 3–3.8 cm long, curved near the top, subcylindrical below, rather abruptly expanded at the bend and funnel-shaped above; *lobes* more or less elliptic or somewhat obovate-elliptic, acute, mucronulate, the 3 upper subequal, 3.5–7 cm long, 2–3.6 cm wide; 3 lower similar to upper but a little shorter and narrower, especially the laterals. *Stamens* arcuate, arising 1–1.3 cm below top of tube; filaments 3–4.5 cm long; anthers linear, subsagittate, 1.2–2 cm long. *Ovary* oblong, 0.8–1 cm long; style reaching middle or top of anthers or sometimes shortly above, with slender linear or linear-oblancheolate conduplicate branches 1–1.3 cm long. *Capsule* globose, 2 cm in diam., seed 5 mm in diam.

Common in Lesotho and the Cape districts which form its south-western borders (Witteberge), rare elsewhere, on grassy or stony mountain slopes and plateaux from 1 700 to 2 900 m alt., flowering from January to March.

COLOUR PLATE 3. FLORENCE SEWELL. *Flower. Pl. Afr.* t.182 (1925).—Inflorescence; corm and basal leaves; longitudinal section of flower: Lesotho.—without precise locality; comm. *Wacher*. 1923.

CAPE.—Barkly East: Avoca, *Orpen*, HAA 1546 (G, K, UPS, Z), s.n. (SAM); Waschbank, *Galpin* 2241 (PRE). Herschel: Witteberge, *Cooper* 605 (BM, K, Z), 3600 (K), *Drège* 3503 (B, CGE, G, L, LD, P, S, SAM), s.n. (P, S); Thode A 519 (PRE). Lady Grey: 38 km W. of Lady Grey, *Reynolds* 3789 (PRE); Lady Grey, N. front of Motkop, *Whitworth* (BOL); Joubert's Pass, *Bruce* 566 (PRE). Maclear: Naude's Nek, *Whitworth* (BOL 24989). Somerset East: 'New Scotland' district, *Orpen* in herb. MacOwan 2253 (SAM).

LESOTHO.—Machache Mt. (Mt. Matchatchi), Maluti Mts., about 32 km E. of Maseru, *Junod* 1927 (G, Z—type of *G. spectabilis*); Maluti Mts., 48 km E. of Maseru, *Mogg* (NBG); 9 km E. of Marakabei, *Nordenstam* 2097 (NBG); Leribe, *Dieterlen* 774 (P, PRE); Mateanong, *Pole Evans* 1 (PRE); summit of

Drakensberg near Satsanna's Nek, *Galpin* 6861 (K, PRE); near Qacha's Nek, *Galpin* (BOL); Thaba Tsuen, Mafeteng, *Beaumont* (BOL 18459); Bokong River valley, *Jacot Guillarmod* 2260 (PRE); *Coetzee* 518 (PRE); Mokhotlong, *Ruch* 2475 (PRE), *Compton* 21517, NBG 121/49 (NBG), *Smith*, NBG 1266/48 (NBG); Phuta, *Compton* 21611 (NBG).

NATAL.—Estcourt: Giant's Castle Game Reserve, top of Injasuti, *Trauseld* 518 (PRE). Inanda: Inanda, *Wood* 1216 (K, SAM). Kranskop: Kranskop, *McKen* 17 (K).

G. saundersii, described the year after *G. cruentus*, has sometimes been confused with it and in fact was figured under that name by Pole Evans in *Flowering Plants of South Africa* in 1925 (t.182). Both have large red flowers marked with white on the lower lobes and grow at high altitudes on the Drakensberg, but they are well distinguished by the shape and set of the flowers. As described above, those of *G. saundersii* are deflexed, with the tube strongly curved a little below the top, more or less cylindrical and slender below then rather abruptly expanded above the bend, the lobes all with pointed tips and the lower ones recurved. In *G. cruentus* they are a darker red and more erect, with the tube expanding more gradually upwards, only slightly curved, and above it somewhat bell-shaped or bowl-shaped with the lobes broadly rounded at the top and not reflexed.

From Medley Wood's description of *G. saundersii* in *Natal Plants* it appears that he must have confused the two species for he described the tube as straight or curved and stated that it was not very common, usually found in crevices of rocks with leaves and flowers hanging downwards, often in inaccessible places. The references to a straight tube and the habitat apply to *G. cruentus* and not *G. saundersii*, a more widespread and very much more common species, especially in Lesotho where it has recently been reported to be becoming almost a weed in cultivated lands, and according to the various records grows on dry grassy or stony slopes and plateaux. A plant from the Maluti Mountains sent to the National Botanic Gardens by Dr Mogg in 1964 flowered the following year.

In a note on some specimens he collected, the late Dr E. E. Galpin mentioned that it was known as the 'Basutoland Lily', and in an account of the flora of the Leribe Plateau in Basutoland Dr E. P. Phillips recorded that the vernacular name was *Khahla ea maloti* (the 'khahla' of the high mountains), and that cooked corms were mixed with the food for persons suffering with diarrhoea (Ann. S. Af. Mus. 16 : 282.1917). Like *G. cruentus*, this species has been used by horticulturists to produce some of the large red hybrids.

The type of *G. spectabilis* Baker has been examined and found to be the same as *G. saundersii*; it was collected by Junod on Mt. Matchatchi (i.e. Mt. Machache) in Lesotho, not the northern Transvaal as stated by Baker.

5. ***Gladiolus oppositiflorus*** Herb., Amaryll. 366 (1837). Type: ex hort. Herbert (K, holo., PRE, photo.)

Plants up to 1.5 m tall, often forming small clumps. *Corm* depresso-globose, the old hard corms long persisting below, with coarse fibres. *Leaves* about 8,

sheathing below, clustered in a fan above, linear to linear-lanceolate, up to 1 m long and 2 cm (rarely 3 cm) broad, long attenuated in upper half, with several raised yellow ribs and covered with a minute pubescence, the hairs on the ribs facing sideways. *Spike* overtopping leaves, up to 1.5 m tall, bearing (10)20–35 distichous or secund, imbricate flowers of which up to 15 may be open at a time, occasionally branched; scape firm enveloped by the leaves, rhachis terete, glabrous or sparsely puberulous. *Bracts* erecto-patent, lanceolate, 3–6 cm long and about 1 cm broad, acute to acuminate or attenuated to a setaceous point, herbaceous, smooth, faintly striate, glabrous or puberulous; bracteoles slightly shorter, apex bifid. *Perianth* large, funnel-shaped, up to 10 cm long, white or in various shades of pink to a deep salmon pink, with dark median lines on the lobes and dark blotches in the throat; tube slender below, gracefully curved, widening upwards, about 5 cm long; limb funnel-shaped, somewhat bilabiate, about as long as tube, the lobes spreading, ovate-lanceolate, acute to acuminate, often undulate; the dorsal central lobe slightly hooded, the upper laterals porrect, lower recurved, bearing a dark median line, occasionally with speckled lines on either side; closing at night. *Stamens* arched below dorsal lobe, with purple anthers. *Capsule* unknown.

Recorded from the eastern Cape, from the neighbourhood of East London to southern Natal, in the coastal belt in grassland; the subspecies *salmoneus* found further inland on rocky ledges on the slopes of the Drakensberg up to 2 500 m alt.; flowering from November to December along the coast but usually February to March at higher altitudes.

Two subspecies are recognized.

KEY TO SUBSPECIES

Spike distichous, up to 30-flowered; perianth white to pink; plants glabrescent	(a) ssp. <i>oppositiflorus</i>
Spike secund or subsecund, up to 20-flowered; perianth salmon pink; plants puberulous	(b) ssp. <i>salmoneus</i>

(a) ssp. **oppositiflorus**

G. oppositiflorus Herb., Amaryll. 366 (1837); Bot. Reg. 28, Misc. No. 98, p. 86 (1842); Bak., J. Linn. Soc. **16** : 176 (1877); Curtis's bot. Mag. t.7292 (1893); Handb. Irid. 218 (1892), Fl. Cap. **6** : 154 (1896). Type: ex hort. Herbert (K, holo., PRE, photo.); probably from the eastern Cape but locality and collector unknown. The type specimen (see fig. 1) closely resembles several collections from the eastern Cape coastal belt, which have the many flowers distichously arranged. Some were noted to be white, or white flushed with pink or entirely pink in colour.

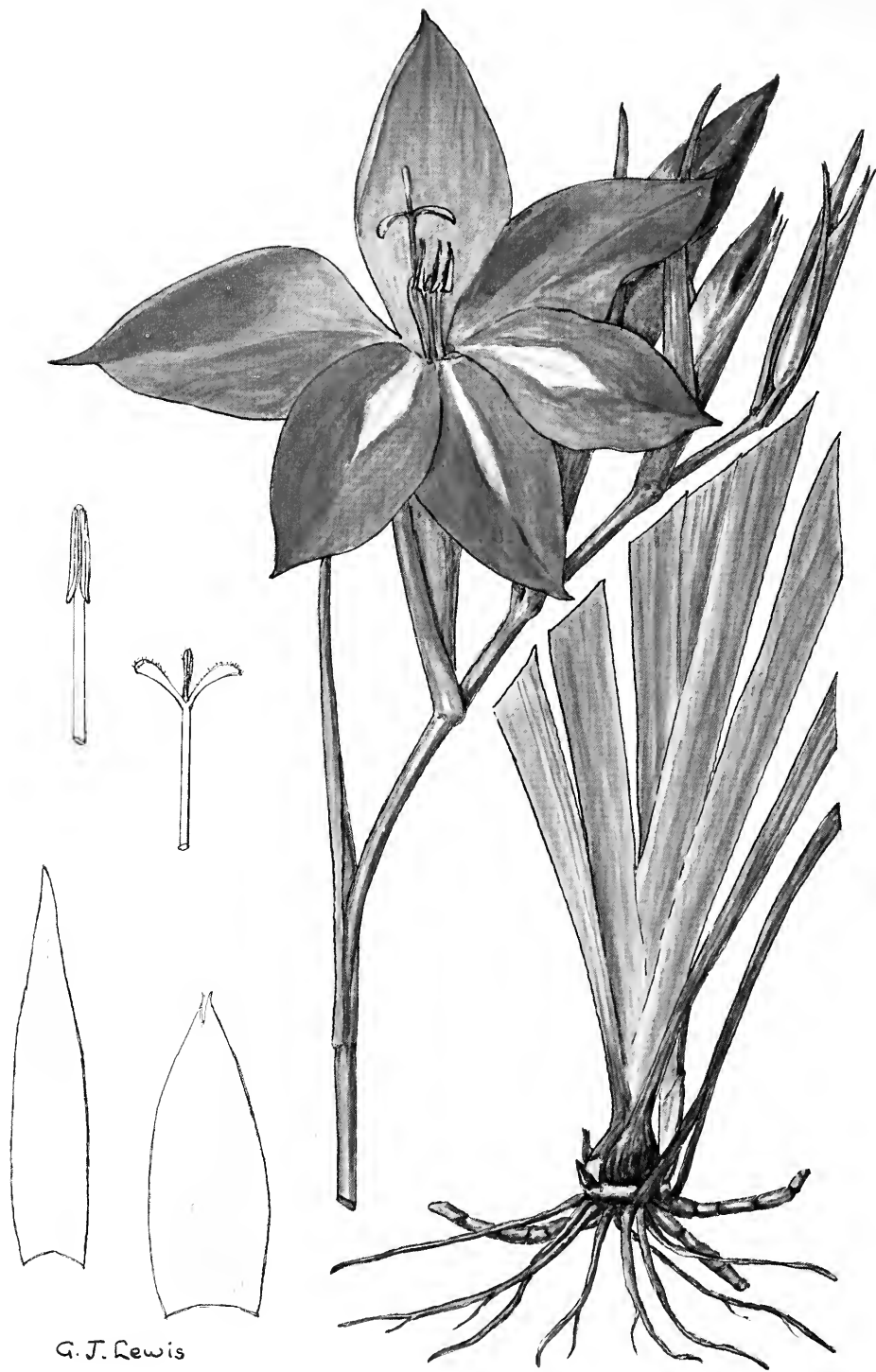
G. mortinius Herb. ex Hook. f. in Curtis's bot. Mag. t.3680 (1838) and note under Curtis's bot. Mag. t.3693 (1838); Loudon, Ladies Flow. Gard. Orn. Bulb. Pl. t.11 (1841). Type: Curtis's bot. Mag. t.3680 (iconotype), ex hort. Herbert; apparently no type preserved.



Pl. 1.

G. cardinalis

Species 1





Pl. 3. *G. saundersii*

Species 4



G.T.C.

Pl. 4.

G. oppositiflorus subspecies *salmoneus*

Species 5b

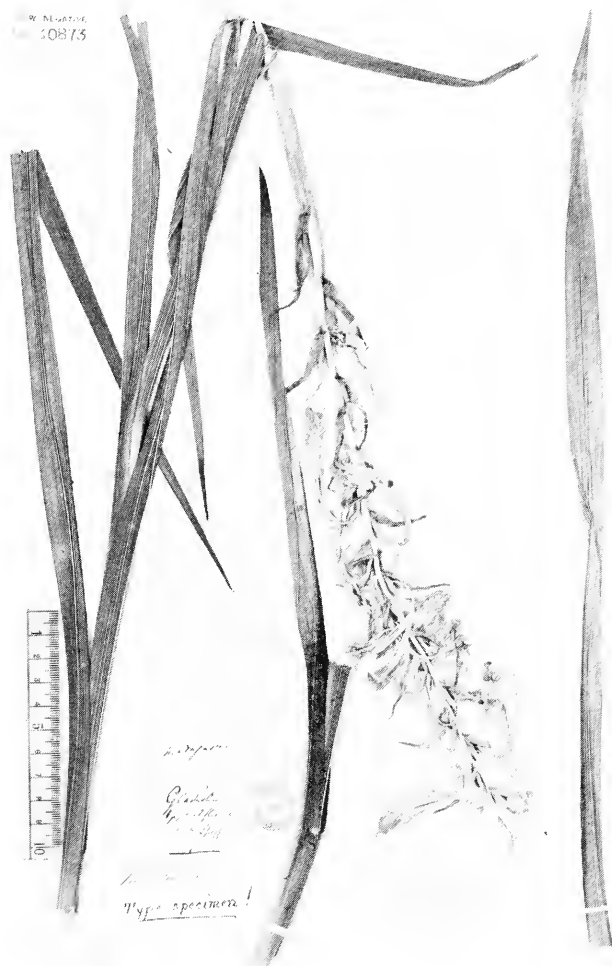


FIG. 1. Type specimen of *G. oppositiflorus* Herb. (K.).

Photo: By courtesy of Royal Botanic Gardens, Kew.

G. blandus Ait. var. *mortoni* (Herb. ex Hook. f.) Bak., Irid. 217 (1892), Fl. Cap. 6 : 155 (1896); as '*G. mortonianus*' Bak. in J. Linn. Soc. 16 : 176 (1877).

CAPE.—East London: damp hillside on roadside between Gonubie and Kwelegha rivers, *Galpin* 5809 (K, PRE), 22 km N.E. of East London, *Hutchinson* 1708 (K); Gonubie River near McLean Town, *Carter* (BOL 19881). Komga: grassy valleys near Komga, *Flanagan* 1047 (PRE); mountainside near Komga, *Flanagan* HAA 1655 (K, BM, G, P, UPS, Z). Kentani: Kentani, hillsides, *Pegler* 250 (PRE); Qora Bridge, edge of krans in Euphorbia scrub, frequent, *Acocks* 12294 (PRE). Stutterheim: Campagna, *Galpin* 7731 (PRE); Kubusie River valley at St. Johns, Dohne, rocky place on slope, *Acocks* 9418 (PRE); Dohne, *Sim* 19883 (PRE). Port St. Johns: Port St. Johns, East Gate, *Galpin* 3497 (PRE); Signal Hill, in long grass on steep slope facing ocean, *Galpin* 9429 (PRE); Bololwa Forest, common in shaly grassland, *Mogg* 13103 (PRE).

One of the most beautiful South African species combining stature with an abundance of large and attractive flowers with many open at the same time. The fairly large corms and the many leaves allow for strong and rapid growth, it is moreover not very selective in its demands and thus easily cultivated.

It is not known how corms or seeds reached Europe and by whom, where or when they were collected. Records show that the typical subspecies inhabits the coastal belt from around East London to Port St. John's. When Herbert cultivated the plant in his garden at Spofforth and described the species, it was believed that, like *G. natalensis*, it had come from the 'Nathal River' but later he suggested that Forbes might have collected them in Malagasy. This can be ruled out for it does not occur there. He mentioned that the species was sold by Dutch nurserymen under the name '*G. floribundus*' but, as it was not the same as Jacquin's *G. floribundus*, he described and named it *G. oppositiflorus* (1837). Britten in the *J. Bot., Lond.* 1899 on p. 273 pointed out that Tausch had also renamed the '*G. floribundus*' of the Dutch in *Flora* (1836) calling it *G. flabellifer* and, since his name was published a year earlier it should be used instead. However, no type of Tausch's could be located. Furthermore Lewis examined two old sheets so named in the Rijksherbarium, Leiden and believed them to be hybrids. There is thus a possibility that the '*floribundus*' of the Dutch was in fact a hybrid and it is for these reasons that Tausch's name is not taken up.

Baker eventually placed *G. mortoni* Herb. ex Hook. f. as a variety of *G. blandus* Ait. (a synonym of *G. carneus* Delaroche) but the description mentions 8–9 leaves which points to *G. oppositiflorus* for *G. carneus* never produces more than five.

(b) ssp. **salmoneus** (Bak.) Oberm. stat. nov. *G. salmoneus* Bak., Handb. Irid. 217 (1892), Fl. Cap. 6 : 153 (1896); L. Bol. in Flower. Pl. S. Afr. 6, t.237 (1926); Batten & Bokelmann, Wild Flrs E. Cape Prov. t.30 f.4, 5, p. 38 (1966). Type: eastern Cape, Griqualand East, mountain slopes around Kokstad, 1 600 m, *Tyson* 1180 (K, holo., SAM). *G. blackwellii* L. Bol. in Ann. Bolus Herb. 3 : 77 (1921); Rendle in Curtis's bot. Mag. t.8919–20 (1938). Type: eastern Cape, Transkei, Tembuland, *Blackwell* sub Marloth 7793 (BOL, holo., K, PRE). *G. blandus* Ait. var. *erubescens* Bullock in Curtis's bot. Mag. 166 t.81 (1949). Type: ex hort. Stanford (K, holo.).

This subspecies is very near the typical form but the flowers face to one side and there are not as many. Usually the plants are somewhat more pubescent, they occur further inland at higher altitudes and flower later in the season.

COLOUR PLATE 4. G. J. LEWIS.—Inflorescence; bracteole; bract; longitudinal section of flower; sketch of leaf.

Cape.—Queenstown, between Queenstown and Aliwal North, *Stretton*. November 1963.

CAPE.—Maclear: Tsitsa Footpath, Drakensberg, *Galpin* 6858 (PRE). Matatiele: hillsides above Matatiele, *Galpin* 14054 (PRE); *Barnard & Mauve* 4867 (PRE), *Jacottet* (Z); 9 km N.E. of Paspalum, dry stony grassy slopes, *Marais* 855 (PRE); Qacha's Nek, near border post, *Barnard & Mauve* 4833 (PRE). Mount Currie: 5 km W. of Kokstad, tall grass veld, rare on dolerite outcrops, *Acocks* 21999 (PRE). Qumbu: Tsitsa Waterfall, riverbank, *Galpin* 6859 (PRE).

NATAL.—Richmond: upper reaches of the Umkomaas River, *Wylie* sub *Wood* 8537 (PRE); Donnybrook, *Wood* 10803 (PRE). Polela: Xumeni Forest, *Gerslner* 7013 (PRE).

The species was used in crossings by plant breeders in the 1830s. The famous *X. G. gandavensis* hybrids thought to be a cross of *G. natalensis* with *G. cardinalis* may have been a cross between *G. natalensis* and *G. oppositiflorus* according to Beal and others. Had nurserymen been able to start off with the ssp. *salmoneus* bearing a secund flowering spike, it would have saved them much time and labour spent on eliminating the unacceptable distichous arrangement.

Some specimens collected in southern Natal on the mountain slopes approach *G. sericeo-villosus* and since both occur in this area, hybridization cannot be excluded. *G. ochroleucus* var. *macowanii* is another large-flowered pink species frequently met with in the eastern Cape. It can be distinguished from the ssp. *salmoneus* by the absence of a 'stem'; its leaves are not sheathing below but emerge almost free from the base; they may persist for more than a season thus giving the plant a caespitose appearance.

6. ***Gladiolus elliotii*** Bak. in J. Bot., Lond. **29** : 70 (1891); Handb. Irid. 215 (1892), Fl. Cap. **6** : 150 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 217 (1893). Type: Transvaal, Bethal district, Steenkool Spruit, *Scott Elliot* 1557 (K, holo.).

G. rigidifolius Bak. in Bull. Herb. Boiss. ser. 2, **4** : 1006 (1904). Type: Transvaal, Germiston district, Modderfontein, *Conrath* 577 (Z, holo., GZU, K, PRE, photo.). *G. dehnianus* Merxmüller in Trans. Rhodesia Scientific Ass. **43** : 150 (1951). Type: Rhodesia, Marandellas, dry veld, *Dehn* 14 (M, holo.).

Plants up to 80 cm high, glabrous or rarely somewhat hairy. Corm depressoglobose, about 2.5 cm in diam., the old hard discoid corms long persistent below, with brown fibrous tunics. Leaves about 7 in an ascending rosette, clasping at the base, lanceolate-acute to linear-acuminate, up to 70 cm long and 1.5 cm broad, with a yellow, raised midrib and margin and several thinner, close-set veins, glabrous or rarely minutely pubescent; in early flowering plants leaves not fully developed. Spike distichous, dense, up to 25-flowered about as long as the leaves, occasionally with a short side branch; scape enveloped by

the upper reduced leaves, rhachis flexuose, with prominent ridges. *Bracts* imbricately arranged, boat-shaped with the apical part curved outwards, acute to setaceous, clasping the rhachis below, bicarinate towards the base, membranous, striate, dull in colour, the apex soon withering and turning brown; bracteole enveloped by, and about as long as or longer than the bract, tubular below, bicarinate, bifid apically with 2 acute to setaceous tips. *Flowers* medium sized, about 5 cm long, thin and delicate in texture, with a white, milky blue or pale mauve background, densely speckled with maroon, purple or pink spots which are concentrated centrally to form a dark line, and with a yellow or greenish oblong area on the lower lateral lobes emerging from the throat; rarely perianth pure white. *Perianth tube* 1.5–2.3 cm long, enveloped by bract and bracteole, thin, arcuate, narrowly funnel-shaped; limb somewhat 2-lipped and prognathous, the lobes lanceolate, up to 3.5 cm long, dorsal hooded, upper laterals erect, lower lobes curved outwards, usually narrower, occasionally clawed. *Stamens* reaching about the middle of the dorsal lobe. *Capsule* oblongo-ellipsoid, up to 2.5 cm long, at first closely enveloped by the bract and bracteole; seeds small, suborbicular, 4–5 mm long.

Recorded from the southern, central and western Transvaal, the north-eastern Orange Free State, northern Natal, Botswana and Rhodesia, in grassland, at altitudes from 1 000 to 1 600 m, flowering from November to May but usually in January.

COLOUR PLATE 5. G. J. LEWIS.—Inflorescence; corm; flower front view; bract and bracteole; flower laid out.

Transvaal.—Waterberg; Rankin's Pass, *Bayliss* 2013 (NBG). December 1964.

NATAL.—Eshowe: Eshowe, *Pearson* (BOL 13705); Utrecht: Klipspruit, *Breyer* sub TRV 16968 (PRE). ORANGE FREE STATE.—Bethlehem: near Bethlehem, *Wagner* in herb. Marloth 13797 (PRE). Harri-smith: Bestersvlei, near Witsieshoek, *Flanagan* 2039 (PRE, SAM), *Bolus*, s.n. (BOL).

TRANSVAAL.—Belfast: Belfast, *Worsdell* (K); Wonderfontein Railway Station, *Bolus* 12351 (BOL, K). Bethal: Steenkool Spruit, *Elliot* 1557 (K); Bethal, *Leendertz* sub TRV. 9994 (PRE). Bronkhorstspuit: near Bronkhorstspuit, *Wilms* 1426 a (BM, G, K); *Brent* 122 (PRE); Honderivier, *Schlechter* 3734 (BOL, PRE); near Premier Mine, *Hutchinson* 2695 (BM, BOL, K, PRE); near Cullinan, *McNeil* (NBG); 43 km N.E. of Roodepoortje Farm, *Repton* 4701 (PRE); Rayton, *Rogers* 20432 (BOL). Ermelo: Ermelo, *Leendertz* sub TRV 7792 (PRE). Germiston: Modderfontein, *Conrath* 577 (GZU, K, Z—type of *G. rigidifolius*). Heidelberg: 30 km S.E. of Heidelberg, *Codd* 6230 (PRE); 35 km S.W. of Heidelberg, *Burt* Davy 3124 (PRE). Johannesburg: Johannesburg, Maloney's Eye, *Moss* 18198 (BM, K). Krugersdorp: Gladysvale Farm, about 14 km W. of Krugersdorp, *Rodin* 3834 (K, PRE). Letaba: 'Maranella' portion of The Downs, *Crundell* (PRE). Lichtenburg: 48 km S. of Lichtenburg, *Aeocis* 12417 (GRA, K, PRE, UPS); Kalkspruit, *Schenck* (Z); Hakkboslaagte, *Kinges* 1992 (PRE). Lydenburg: near Lydenburg, *Kässner* 78 (BR). Marico: Grootpan, *Pretorius* (PRE). Middelburg: Middelburg, *Gilfillan* in herb. Galpin 329 (K), 322 (BOL), *Jenkins* sub TRV 10066 (PRE). Pietersburg: *Bolus* s.n. (BOL). Pilgrim's Rest: Pilgrim's Rest, *Greenstock* (BM). Potchefstroom: Klipdrif, E. of Potchefstroom, *Theron* 1136 (PRE); Potchefstroom, *Theron* 1 (PRE). Potgietersrus: Pyramid Estate, near Potgietersrus, *Galpin* 9092 (BOL, PRE, Z). Pretoria: near Pretoria, *Burt* Davy 1166 (PRE). Obermeyer 116 (PRE), *McLea* in herb. Moss 5794 (K) in herb. Bolus 5794 (BOL); Broederstroom, *Prosser* 1204 (K, PRE), s.n. (NBG); Kaalfontein, *Pole Evans* sub PRE 13519 (K); Hornsnek, about 32 km from Pretoria, *Dyer* 3404 (K, PRE); between Silverton and Derdepoort, *Pole Evans* (K); Fountains valley, *Repton* 209 (PRE); Rietondale Pasture Research Station, *Traffnell* 604 (K); Koedoespoort, *Rehmann* 4692 (Z), *Smith* 1532, 1555, 1620 (PRE). Rustenburg: near Woodstock, *Smith* 40 (BR); Rustenburg, *Collins* sub TRV 7143 (PRE), *McLea* in herb. Bolus 3094 (BOL); Kransberg, Groothoek Farm, *Codd* 6319, 6482, 3951 (PRE); foot of Kransberg, *Dyer* & *Verdoorn* 4224 (PRE); Kransberg, 32 km N.E. of Thabazimbi, *Codd* 3738 (PRE). Springs: near Delmas, *Codd* 6373 (PRE); *Burt* Davy PRE 10006 (PRE); Springs, *Bayliss* 1879 (NBG). Standerton: Standerton, *Burt* Davy 931

(PRE). Warmbad: near Warmbad, *Burt Davy* 2233 (PRE), *Leendertz* sub TRV 7580 (PRE), *Sidey* 1414 (PRE, S). Waterberg: road to Palala, *Smuts & Gillett* 3328 (K, PRE); Palala River, *Breyer* sub TRV 21433 (PRE); 40 km N.W. of Naboomspruit, *Galpin* 13393 (PRE); Roodepoort Farm, Palala road, *Galpin* 11616 (PRE), s.n. (BOL); Mosdene, Naboomspruit, *Galpin* M331 (PRE, SAM); Springbok Flats, *Pole Evans* PRE 3964 (PRE), *Meeuse* 9549 (PRE); Farm Eerste Geluk, *Galpin* 133148 (K, PRE) s.n. (BOL); near Sandrivierspoort, *Smuts* 374 (BM, BOL, K, PRE); 16 km N. of Nylstroom, *Lang* sub TRV 31095 (K, PRE); about 32 km N. of Nylstroom, *Gillett* 3233 (BOL); about 13 km from Vaalwater on Hermanusdoorns road, *Meeuse & Strey* 10411 (K, LD, PRE, S, UPS); Nylstroom, *De Jongh* in herb. *Galpin* 5906 (PRE), 6496 (GRA, PRE). Witbank: near Witbank, *Rogers* 2535 (GRA, Z), *Gilfillan* in herb. *Galpin* 7254 (GRA, PRE), *Rand* 124 (BM).

WITHOUT LOCALITY.—*Adlam*, hort. *Leichtlin* (K).

Baker described this species twice, first as *G. elliotii*, then thirteen years later as *G. rigidifolius*, with a very misleading statement after the description of the latter that it was near *G. striatus* Jacq. [= *Babiana striata* (Jacq.) Lewis], which it does not in the least resemble. The types have been examined and found to be conspecific so the later name falls away into synonymy.

Characteristic of *G. elliotii* is the distichous, closely imbricate, many-flowered spike. This it has in common with the related species *G. sericeo-villosus* but it is smaller in stature, usually glabrous, the fan of leaves is not so elongated, the leaves are less sclerotic and the fewer but somewhat larger flowers are a pale mauve or white, speckled with dark spots. The bracteole is tubular at the base, and has two dorsal winged keels. The ranges of these two species overlap in the Transvaal but *G. sericeo-villosus* occurs further south, in the eastern Cape and Natal, where *G. elliotii* is absent (there is one record from northern Natal); the latter, however, extends further northwards to Rhodesia and westwards to eastern Botswana. A few sparsely hairy specimens have been collected which may be due to some crossing with *G. sericeo-villosus*.

7. *Gladiolus sericeo-villosus* Hook. f. in Curtis's bot. Mag. t.5427 (1864). Type: ex hort. Kew, *Cooper* (K, holo.). 'Communicated to Kew by W. Saunders; collected by Mr Cooper in the interior of the Cape Colony.'

Plants up to 2 m high. *Corms* globose, up to 4 cm in diam. with the old hard flattened corms long persisting below, densely covered with thick fibres. *Leaves* about 7 in an elongated fan, vaginate below, forming a 'stem', linear, up to 2 m long and 2 cm broad, long tapered to a setaceous point, sclerotic with the swollen margin minutely scabrid and with numerous raised yellow ribs, glabrescent or setulose with short hairs and papillae especially so on the ribs. *Spike* shorter or about as long as the leaves, with the many flowers distichously and imbricately arranged, occasionally with a basal side-branch, scape woody, enveloped by the upper reduced leaves, rhachis flexuose, ridged, with a white villous pubescence consisting of long, curly, flattened white hairs, or rarely glabrescent. *Bracts* erect, partly enveloping the rhachis, cymbiform, up to 3 cm long with a white villous pubescence which is concentrated on the central area, or glabrescent, apex acuminate to setaceous, patent to reflexed, with membranous, occasionally denticulate and/or fimbriate margins, bicarinate at the base; bracteole enveloped by bract, bicarinate with the keels often winged,

bifid with the apices acute to setaceous, occasionally tubular below in the forma *calvatus*. *Flowers* up to 40, distichous, closely imbricate, becoming more widely spaced with age. *Perianth* medium sized usually c. 4.5 cm long but occasionally up to about 6 cm long, somewhat 2-lipped, cream, yellow or in various shades of pink, lavender or wine-red, plain or rarely somewhat speckled, with linear, oblong or sagittate, yellow or green, dark-edged blotches on the lower lobes emerging from the throat. *Perianth tube* curved, narrowly funnel-shaped, about 2 cm long; upper lobes erect, dorsal about 2.5–3 cm long, somewhat hooded, lanceolate, lower somewhat smaller and narrower, occasionally attenuated below, lowest lobe curved downwards, slightly prognathous, longer than laterals. *Stamens* reaching about the middle of the dorsal lobe. *Capsule* oblongo-ellipsoid, 2 cm long, at first enveloped by the bracts; *seeds* 5–6 mm in diam., semi-orbicular with a broad wing.

Distributed from the north-eastern Cape to the eastern Orange Free State, Natal, Swaziland and the Transvaal, fairly frequent on mountain grassland or in black turf, at altitudes from 100 to 2 100 m, flowering from December to June but mainly in January–February.

Two forms are recognized:

KEY TO FORMS

- | | |
|---|-----------------------------------|
| Spike with villous pubescence on the rhachis and bracts; bracteoles with free margins | (a) forma <i>sericeo-villosus</i> |
| Spike without villous pubescence; rhachis and bracts glabrous or sparsely ciliate; bracteoles often tubular below or occasionally with free margins | (b) forma <i>calvatus</i> |

(a) forma **sericeo-villosus**

Gladiolus sericeo-villosus Hook. f. in Curtis's bot. Mag. t.5427 (1864); Bak., Syst. Irid. 175 (1877), Handb. Irid. 215 (1892), Fl. Cap. **6** : 151 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 224 (1893). Type: hort. Kew, leg. *Cooper* (K, holo.). 'Communicated to Kew by W. Saunders, collected by Mr Cooper in the interior of the Cape Colony.' —var. *ludwigii* Pappe ex Bak. in J. Linn. Soc. **16** : 175 (1877). Type var.: as for *G. ludwigii*. —var. *rubicundus* O. Kze., Rev. Gen. 3, **2** : 308 (1898). Type var.: Natal, Estcourt district, Highlands Station, *Kuntze* (NYS, holo.).

G. ludwigii Pappe ex Bak., Handb. Irid. 215 (1892), Fl. Cap. **6** : 150 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 219 (1893); Verdoorn in Letty, Wild Flow. Transv. 84, t.40, 2 (1962). Type: Natal, without precise locality, *Pappe* (K, holo.).

Antholyza hirsuta Klatt in Linn. **35** : 379 (1867–68); non Lam. (1783). Type: as for *G. ludwigii*.

The typical form has the rhachis and bracts covered to a larger or lesser degree with a villous pubescence, while the leaves too are covered with minute setae which spread horizontally from the raised yellow ribs.

The range of this form is from the north-eastern Cape to Natal, the eastern Orange Free State, Swaziland and the southern Transvaal, on grassy slopes at altitudes from 500 to 1 500 m above sea-level, flowering from November to May.

CAPE.—Flagstaff: 20 km W. of Bizana, *Codd* 9335 (PRE). Mount Currie: Suurberg, between Kokstad and Clydesdale, *Tyson* 1141 (SAM); near Clydesdale, Umzimkulu River, *Tyson* 1547 (SAM).

NATAL.—Camperdown: Botha's Hill, *Strey* 4814 (PRE). Estcourt: Giant's Castle Game Reserve, *Trauseld* 386 (PRE); from Estcourt on Middlerest road, *Acocks* 13464 (PRE). Hlabisa: Hluhluwe Game Reserve, *Ward* 4620 (PRE). Nkandla: above Tugela valley on road to Vryheid via Jamisonsdrif, *Sidey* 3469 (PRE). Paulpietersburg: between Utrecht and Paulpietersburg, *Codd* 47a (PRE). Pietermaritzburg: Pietermaritzburg commonage, *Sim* s.n. (BOL. 14948, PRE). Polela: near Donnybrook, *Acocks* 22125 (PRE). Richmond: Byrne, *Galpin* 12025 (PRE); *Haygarth* sub Wood 10803 (PRE). Umlazi: Illovo, *Wood* 6442 (PRE). Umvoti: Mount Alida Police Station, *Marais* 806 (PRE).

SWAZILAND.—Hlatikulu: near Hlatikulu, *Compton* 31354 (PRE).

TRANVAAL.—Ermelo: 26 km E. of Ermelo, *Mauve & Toelken* 4530 (PRE). Piet Retief: Mooihoek, *Devenish* 330 (PRE). Soutpansberg: Fleurfontein, near Louis Trichardt, *D'Arcy* 10583 (PRE). Wakkerstroom: farm Oshoek, *Devenish* 1009 (PRE); Wakkerstroom, *Thode* s.n. (PRE), *Van der Merwe* 32 (PRE).

(b) forma **calvatus** (Bak.) Oberm. comb. nov.

G. ludwigii Pappe ex Bak. var. *calvatus* Bak., Fl. Cap. **6** : 150 (1896); Phill. in Flower. Pl. S. Afr. **4**, t.125 (1924); l.c. **9**, t.337 (1929). Type: Transvaal, near Barberton, Umvoti Creek, *Galpin* 925 (K, lecto).

G. sericeo-villosus Hook. f.—var. *glabrescens* L. Bol. in S. Afr. Gdng Ctry Life **18** : 213, fig. A, 1–10 (1928). Type var.: Transvaal, Carolina district, Waterval-Boven, *Hutchinson* (NBG 873/27); from corms that flowered at Kirstenbosch.

G. ochroleucus sensu Bak. quoad Curtis's bot. Mag. t.6291 (1877), non Bak. 1876. The plate was executed when corms, collected by Mr Bull in the Transvaal, flowered at Kew.

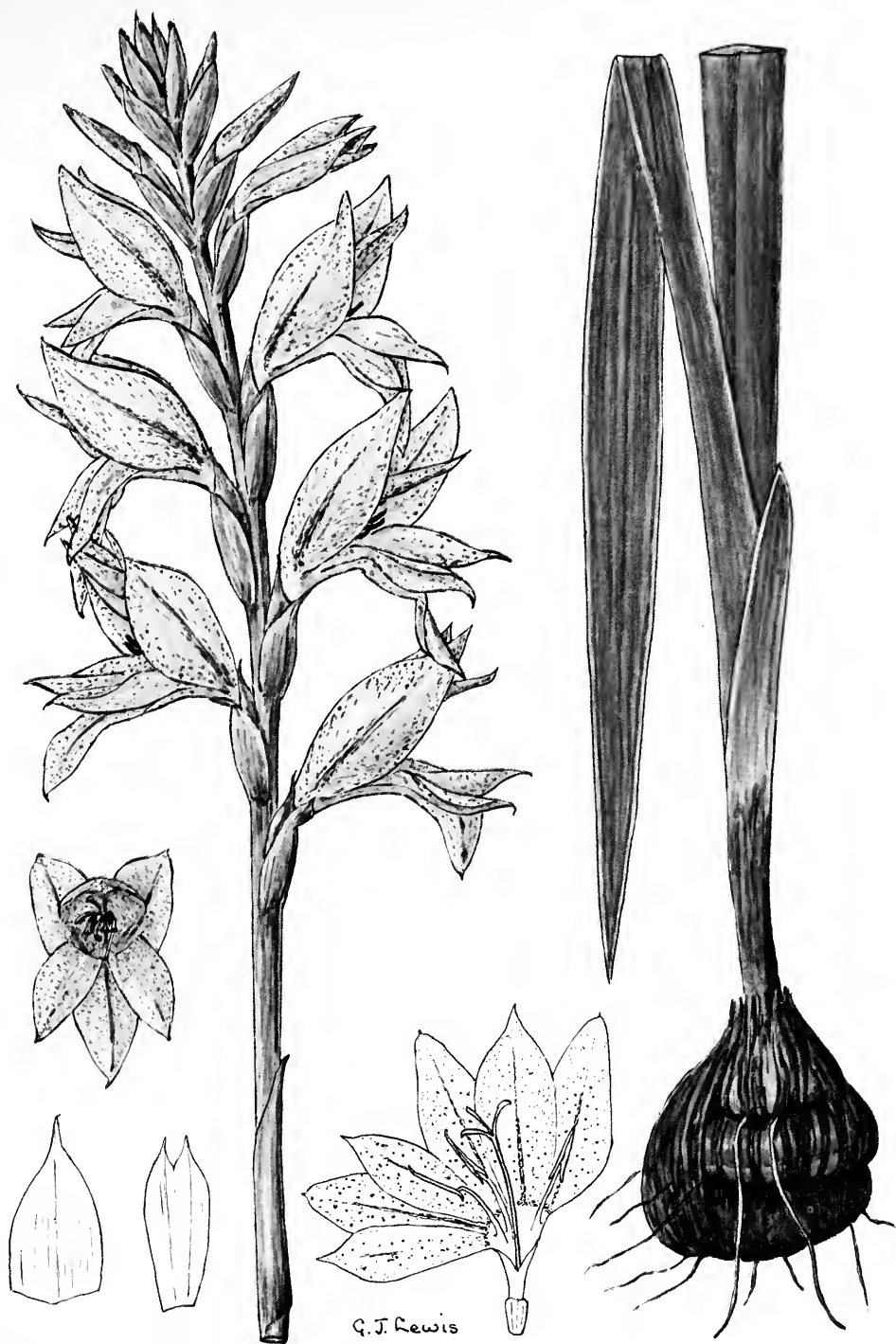
Plants of this form are devoid of the villous white pubescence on the rhachis and bracts but some scattered, small, straight hairs may be present and in some plants the leaves are glabrous but otherwise they match the typical form. Its range of distribution is confined to the Transvaal from Barberton westwards to Rustenburg and northwards as far as the Letaba district. It also flowers in the summer and autumn.

TRANVAAL.—Barberton: Flats between Kaapschoop and Barberton, about 32 km from Barberton, *Van Nieuhuys* sub PRE 8025 (PRE); Crescent Hill near Barberton, *Edwards* 9 (PRE). Belfast: Waterval-Boven, *Pole Evans* s.n. (PRE); Schoemanskloof 40 km N.E. of Machadodorp, *Codd* 7760 (PRE); 13 km W. of Dullstroom, *Codd* 6472 (PRE). Bethal: near Leslie, *Enslin* s.n. (PRE). Brits: Brits, *Pole Evans* (PRE 2731); Wolhuterskop, *Pole Evans* (PRE 19017). Heidelberg: Heidelberg, *Bonsma* sub TRV 10418 (PRE). Letaba: Duiwelskloof, *Galpin* 10131 (PRE), 11374 (PRE). Nylstroom: Makapanspoort, *Schlechter* 4686 (PRE). Potchefstroom: Klipdrif, *Theron* 1136 (PRE). Pretoria: Onderstepoort, *Mauve* 4348 (PRE). Rustenburg: 57 km N. of Swarttruggens on black turf flats, *Acocks* 1918 (PRE); Rustenburg, *Playford* (PRE 17266).

Phillips was the first to observe the tubular bracteole, illustrated on t.337 in *Flowering Plants of Africa*. Louisa Bolus also describes them with united margins in her variety *glabrescens*. In the tubular bracteole a small thin membrane unites the lower margins but with the expansion of the ovary it is torn apart. In typical plants of *G. sericeo-villosus*, however, there is a distinct gap between the edges of the bracteole even in bud. The closely related *G. elliotii* also possesses



FIG. 2. *G. sericeo-villosus* forma *calvatus*.



Pl. 5.

G. elliotii

Species 6



Pl. 6.

G. natalensis forma domesticus

Species 11

tubular bracteoles but the plants placed here in the forma *calvatus* sometimes have them tubular and sometimes free; those which have tubular bracteoles differ from *G. elliotii* and resemble *G. sericeo-villosus* more closely; they are taller, sclerotic and many flowered with smaller, differently coloured perianths. This will need further investigation. The tubular shape of the bracteole will certainly interest morphologists for it may shed further light on the controversy about the origin of the bract, whether it originated from one or two modified leaves.

FIG. 2. From a painting by Cythna Letty. *Flower Pl. Afr.* t.337 (1929); sub nom. *Gladiolus ludwigii* Pappe ex Bak.—Top of flower spike; 1, longitudinal section of flower, $\times 1\frac{1}{2}$; 2, bract and bracteole, $\times 1\frac{1}{2}$; 3, bract with tip dying back, $\times 1\frac{1}{2}$; 4, bracteole, tubular below, $\times 1\frac{1}{2}$; 5, portion of leaf, $\times 2\frac{1}{2}$.

Transvaal.—Barberton, *Van Nouhuys* (PRE 8025), ex hort. Pretoria. April 1929.

8. ***Gladiolus varius*** Bol. f. in Ann. Bolus Herb. 2 : 104 (1917), exclud. var. *elatus*. Type: Transvaal, Pilgrim's Rest, *Rogers* 14601 (BOL, holo., K).

Plants up to 1 m high, forming small clumps. *Corm* rounded, densely covered with brown fibres, the cinnamon brown leaf bases forming a neck. *Leaves* 2–7, sheathing at the base only, distichous, linear, up to 60 cm long and 5 mm broad, coriaceous, often straggling, inner 2–3 reduced, clasping the scape. *Spike* overtopping the leaves, secund, imbricate, (3–)8–14 flowered, several open at a time; bracts lanceolate-acuminate, 2–5 cm long, thin, green, soon turning cinnamon brown, closely nerved with the ribs raised, whitish, the grooves in between densely speckled with orange-brown linear spots, without hyaline margins. *Flowers* a bright phlox pink to a light pink, with a lilac medial line on lower lobes, not blotched when dry, varying in size, soft in texture; with a long tube and well-developed limb in the typical species; the subspecies with a short tube and short limb. *Perianth tube* thin, curved, varying from 1 to 5 cm long; limb funnel-shaped to bell-shaped, the lobes up to 4 cm long, ovate to lanceolate, the central dorsal widest, the lower narrower. *Capsule* (mature?) oblongo-ellipsoid, 15 mm long; *seeds* (immature) rounded with a narrow circular wing.

A montane species endemic in the eastern Transvaal from Barberton and western border of Swaziland to the Woodbush area, growing in rock crevices where the corms become deep-seated; found at altitudes up to 2 500 m, flowering from the end of February to April (May), occasionally earlier.

Two varieties are recognized.

KEY TO VARIETIES

Perianth up to 7 cm long, with a long tube and long lobes	..	..	..	(a) var. <i>varius</i>
Perianth up to 4 cm long, with a short tube and shorter lobes	..	..	..	(b) var. <i>micranthus</i>

The typical variety is one of the showier *Gladiolus* species found on the escarpment in the eastern Transvaal. The corms become deeply wedged in rock fissures, the plant base being surrounded by the cinnamon brown leaf remains so typical of this species. The papery bracts, too, assume this colour with age and the flowers are a deep pink with a slight mauve tinge. The spikes closely resemble those of *Watsonia transvaalensis* but in the latter the flowers are distichously and more closely arranged and the perianth is more open. There is much variation in the size of the perianth and it was at first believed that 2 species were involved, *G. varius* and *G. micranthus* Bak. 1904 (the latter a homonym twice over). The smaller flowers, looking exactly like those of typical *G. varius* in the bud stage, appear to be the result of inhibited development. The perianth unfolds when still immature and the stamens, which ripen at an early age, shed their pollen in the normal way. This was observed in flowers picked early in the bud stage and placed in water and in plants cultivated in Pretoria where the habitat did not suit them. But, although we find both the large and the small forms on and around Mount Anderson, we have records of only the small flowered form from the Woodbush area further north. One might classify this behaviour as paedogenesis.

(a) var. **varius**

G. varius Bol. f. in Ann. Bolus Herb. 2 : 104 (1917). Type: Transvaal, Pilgrim's Rest, Rogers 14601 (BOL, holo., K).—var. *brevifolius* Bol. f., l.c. Type var.: Barberton, Saddleback Mountain, Galpin 828 (BOL, K, Z); excl. var. *elatus* Bol. f., l.c.

In the typical variety the perianth has become well-developed up to 7–8 cm long and it bears a long thin curved tube. The flower colour is a deep phlox pink. The type of var. *brevifolius* Bol. f. merely represents a short-leaved plant but var. *elatus* should be transferred to *G. hollandii* L. Bol.

TRANSCAAL.—Barberton: about 16 km from Barberton on Havelock road, mountain grassland, Meeuse 10114 (PRE); Lomati valley, Thornecroft 1125 (PRE, Z), 1126 (PRE). Lydenburg: top of Mount Anderson 19 km east of Lydenburg, Reynolds 5896 (K, PRE), Galpin 13776 (K, PRE), Mauve & Collett 4630 (PRE), Leistner & Mauve 3217 (PRE).

(b) var. **micranthus** (Bak.) Oberm. stat. nov.

G. micranthus Bak. in Bull. Herb. Boiss. ser. 2, 4 : 1005 (1904); non Stapf 1885, nec Baker 1892. Type: Transvaal, Shilouvane, Junod 1716 (G, holo., Z).

The flowers of this variety are small, up to 4 cm long and vary in colour, white flushed with pale pink to deep pink or lilac, with age; the lower lobes bear a medial yellow or lilac line sometimes surrounded by a darker area. The perianth is narrowly bell-shaped with a short tube. It is more common and more widespread than the typical variety but it is also more variable and often depauperated, bearing only 2 narrow short leaves and a small, few-

flowered spike. These specimens are usually recorded as coming from exposed high marshy areas and often flower early.

TRANSVAAL.—Barberton: top of Saddleback Mt., *Galpin* 828 b (BOL, SAM, Z); near Alpine Mine, *Strey* 4059 (PRE). Belfast: 6 km N. of Dullstroom on Tonteldoos road, *Reynolds* 2305 (BOL, PRE); 5 km N. of Dullstroom, *Codd* 6719 (K, PRE); hills above Dullstroom, *Van der Merwe* 1265 (PRE). Letaba: Shilouvane, *Junod* 1716 (G, Z); Shilouvane, slopes of Mamotsuri (Mamotzeeri), *Junod* 1203 (G, K, LD, PRE, Z); Shilouvane, Marovunye, *Junod* 2773 (Z); Duiwelskloof, Letaba, *Scheepers* 952, 167 (PRE); 'Marake', The Downs, *Crundall* (PRE). Lydenburg: 14 km E. of Draaikraal on Steenkampsberg, *Codd* 6459, 9856 (PRE), *Reynolds* 5898 (K, PRE). Lydenburg-Dullstroom, *Pole Evans* (PRE 4501). Pietersburg: Mphome ('Mount Mpone') *Schlechter* 4727 (BOL, C, G, GRA, K, P, PRE, S, UPS, Z); Wolkberg, near Haenertsburg, *Thompson* (NBG). Pilgrim's Rest: Pilgrim's Rest, *Rogers* 14928 (BOL); Graskop, *Brent* 121 (PRE), *Thorncroft* 987 (PRE), *Burtt Davy* 1472 (PRE); Graskop Reservoir valley, *Galpin* s.n. (BOL), 14572 (K, PRE); 14 km from Graskop, *Liebenberg* 2973 (PRE); Kowyn's Pass, near Graskop, *Lewis* 6174 (NBG); Mount Anderson, *Galpin* 13579 (BOL, PRE), NBG 640/30 (BOL), 13778 (K, PRE), 13661 (PRE); Long Tom Pass, *Brent* 127 (PRE, K); Mount Anderson to Sabie, *Pole Evans* s.n. (K, PRE 3992); Berg Plateau, *Mudd* (K); MacMac Falls, *Mudd* (K), *Prosser* 2047 (PRE), *Brent* 125 (PRE).

SWAZILAND.—Pigg's Peak: 5 km W. of Pigg's Peak, *Codd* 7822 (K, PRE).

When Baker described this taxon as *G. micranthus* in 1904, he was using a homonym for previously Stapf in 1885 used this epithet for a *Gladiolus* from Asia Minor and then Baker himself in 1892 used it for a species from Botswana. The latter was renamed *G. bakeri* Klatt ex Durand & Schinz (1893), but was not listed by Baker in either the *Flora Capensis* or the *Flora of Tropical Africa*. Our taxon is clearly not the same as the one from Botswana.

(Cf. uncertain species, p. 297.)

9. ***Gladiolus ochroleucus*** Bak. in J. Bot., Lond. **14**: 182 (1876). Type: eastern Cape, Umtata district, Baziya Mountain, *Baur* 94 (K, holo., B, BOL, SAM, Z).

Plants 45–75(–100) cm high. *Corm* globose, 1.5–4 cm in diam. covered with matted pale brown fibres, often producing sessile cormlets. *Leaves* 6–12, often evergreen, distichous, free or nearly so from the base (not forming a 'stem'), usually ensiform, about 30 cm long, 1.5 cm wide, occasionally the leaves longer and narrower, with a yellow margin and 5–8 raised ribs, midrib acentral, occasionally pubescent below. *Spike* up to 1 m tall, often with a short basal branch; with several to many distichous or secund flowers which are imbricate in the early stages but more laxly spaced with age. *Bracts* oblong, 3–7 cm long, acute to acuminate, membranous, amplexicaul at the base, usually erect. *Flowers* varying in size and colour, funnel-shaped with a spreading limb; in the var. *ochroleucus* about 3.5 cm long, in the var. *macowanii* about 7.5 cm long, whitish, cream, yellowish (often fading to pink), pink or mauve with the throat and central veins usually a deeper colour. *Perianth tube* curved, 1.5–3.5 cm long, tubular below, widened into a funnel-shaped throat with the limb spreading, the outer lobes longest giving the flower an obtriangular shape front view. *Perianth lobes* about as long as the tube, oblong to ovate, acute to acuminate, recurved; dorsal lobe widest, somewhat hooded, upper laterals spreading; the 2 lower laterals placed above the lowest lobe which is longer

and laxly recurved. *Stamens* reaching halfway up the dorsal lobe, anthers 12 mm long. *Capsule* oblongo-ellipsoid, 12 mm long; seed circular, 5 mm in diam. with a wide wing.

Widespread in the eastern Cape, from Knysna to Pondoland and Lesotho, in grassland from near the sea to the slopes of the Drakensberg at altitudes up to 2 000 m, flowering from February to April, occasionally out of season, depending on the rains.

Lewis upheld three species in this complex: 1, the small yellow-flowered *G. ochroleucus* (syn. *G. masoniorum*); 2, the small pink-flowered *G. kirkii* (syn. *G. reductus* and *G. stanfordiae*) with *G. triangulus* reduced to a larger flowered variety; 3, *G. macowanii* (syn. *G. davisoniae*) the large pink-flowered taxon.

In March 1970 an excursion was made to the eastern Cape to investigate this taxonomic problem, but the severe drought had prevented the plants from flowering. Only one plant was found in flower near Stutterheim and a colony in seed on the dunes at Mazeppa Bay. Although therefore it was not possible to procure fresh flowering material the taxon was recognizable by the short ensiform leaves, sometimes stunted by the drought, and appeared to be widespread and still quite common in many areas. Since variation in perianth size is a well-known character in other species of the genus, it was decided to treat the taxon as one variable species divided into a small- and a large-flowered variety.

KEY TO VARIETIES

- | | |
|--|-----------------------------|
| Perianth 4–5 cm long, the lobes fairly short, acute to obtuse, white, cream, yellow or pink | (a) var. <i>ochroleucus</i> |
| Perianth 7–9 cm long, the lobes lanceolate, somewhat attenuated, pink to deep pink with a darker coloured throat | (b) var. <i>macowanii</i> |

(a) var. *ochroleucus*

G. ochroleucus Bak. in J. Bot., Lond. **14** : 182 (1876), J. Linn. Soc. **16** : 175 (1877), Handb. Irid. 216 (1892), Fl. Cap. **6** : 151 (1896); Phill. in Ann. S. Afr. Mus. **16** : 281 (1917); Batten & Bokelmann, Wild Flrs E. Cape Prov. t.33 f.3 (1966). Type: eastern Cape, Umtata district, Baziya Mountain, *Baur* (K, holo., B, BOL, GRA, SAM, Z). *G. kirkii* Bak. in Gard. Chron. **8** : 524 (1890), Fl. Cap. **6** : 151 (1896); non Handb. Irid. 222 (1892). Type: eastern Cape, King William's Town, comm. *Kirk* (K, holo.). *G. carneus* sensu Klatt in Linnaea **32** : 722 (1863); non Delaroche (1766). *G. reductus* Bak. in Bull. Herb. Boiss. ser. 2, **4** : 1006 (1904). Type: eastern Cape, East London, *Conrath* 581 (GZU, holo. PRE, photo.). *G. masoniorum* C. H. Wright in Kew Bull. **1913** : 305 (1913); Prain in Curtis's bot. Mag. t.8548 (1914). Type: eastern Cape, Tembuland, *Mason* (K, holo.). *G. stanfordiae* L. Bolus in S. Afr. Gdng Ctry Life **17** : 293–4, f.5 (1927) et **19** : 153, f.3 (1929); J. bot. Soc. S. Afr. **14**, t.2 (1928); Hutchinson in Curtis's bot. Mag. t.9522 (1938); Batten & Bokelmann, Wild Flrs E. Cape Prov. t.32, f.1, et t.33 f.1 (1966). Type: eastern

Cape, without precise locality ex nursery K. Stanford (BOL, holo.).

G. triangulus Lewis in S. Afr. Gdng Ctry Life **23** : 140 f.A. (1933), Flower. Pl. S. Afr. **14**, t.550 (1934). Type: eastern Cape, Albany district, Bushmans River, *Holland* 4006 (BOL).

The plant illustrated in Curtis's bot. Mag. t.6291 as *G. ochroleucus* is *G. sericeo-villosus* Hook. f. forma *calvatus*.

The ample herbarium material shows great similarity vegetatively. The perianth however varies in size and colour; the type description was based on a yellow-flowered form but forms with flowers in shades of pink are much more prevalent.

This variety is common and widespread throughout the range of the species with the same flowering times as the other variety.

CAPE.—Albany: near Grahamstown, *Rogers* 27648 (Z), *Dyer* 2364 (BOL), *Sidey* 724 (PRE); 21 km S.W. of Grahamstown, *Acocks* 13620, 14036 (PRE); Salem, *Britten* 7300 (BOL); about 96 km from Coega on Grahamstown road, *Comins* 763 (K, PRE); Bushmans River, *Holland* 4006 (BOL). Alexandria: Spadona Farm, *Galpin* 10830 (K, P, PRE); Olifantshoek, *Ecklon & Zeyher* 174 (S), *Pappe* (K); between Whitney and Alexandria, *Holland* 3828 (BOL); Alexandria, *Galpin* 10674 (PRE), NBG 680/31 (BOL); Suurberg, *Schonland* 3195 (GRA), *Holland* 68 (GRA), *Long* 957 (GRA, K, PRE). Bathurst: Port Alfred (Kowie), *Rogers* 17146 (Z), *Tyson* (BOL, GRA, PRE), *Sidey* (PRE), *Schonland* (BOL); Kleinmond, *White* (BOL, GRA, PRE). Butterworth: Butterworth, *Germishuizen* 78 (K). East London: East London, *Conrath* 581 (GZU—type of *G. reductus*), *Page* (BOL 16923), *Batten* (NBG), *Martin* 684 (NBG), *Barker* 2049 (NBG); Buffalo Pass, *Barker* 3527 (NBG); Kidd's Beach, *Barker* 102 (BOL, GRA, K, NBG), *Leighton*, NBG 421/33 (BOL), *Taylor* 5583 (NBG), *Comins* 1479 (PRE); Kayser's Beach, *Carter*, NBG 70/29 (BOL); Igoza Bridge, 16 km S. of East London, *Bayliss* 2344 (NBG); Gonubi Springs, *Peacock* (SAM 65816), *Johns* (NBG); Gonubie River, *Dyer* 1988 (BOL, K), 2251 (GRA, PRE); 17 km from East London on King William's Town road, *Van Breda* 889 (K, PRE); 41 km from East London on Butterworth road, *Van Breda* 862 (PRE). Keiskammahoek: Keiskammahoek, *Hutton* (K). Kentani: Kentani, *Pegler* 719 (BOL, GRA) 824 (BOL, K, PRE); Mazeppa Bay, *Theron* 1209 (PRE), *Plowes* 2412 (PRE); Kei road, *Ranger* (BOL, PRE). King William's Town: King William's Town, *Kirk* (K), *Sim* 1144 (PRE); Berlin, *Sidey* 631 (S), *Hauser* (NBG), *Leighton*, NBG 242/32 (BOL); Izeli (Zeze), *Sim* 19922 (PRE); between Debe Nek and Keiskammahoek, *Dyer* 1978 (GRA). Knysna: Belvedere, near Knysna Lagoon, *Woolley* (NBG). Komga: Komga, *Bolus* 10314 (BOL), *Bokelmann* (NBG); Morgan Bay, *McNeil* (NBG); Cape Morgan, *McNeil* s.n. (NBG), *Wilman* 1079 (BOL, NBG), near Kei Mouth, *Flanagan* 637 (K, GRA, PRE), 1215 (BOL, GRA, PRE, SAM), *Schlechter* 6202 (Z), *Codd* 6343 (PRE); near Komga, *Flanagan* 638 (GRA, PRE, SAM); near Kei Mouth, *Flanagan* 2334 (BOL, PRE); Kei, *Drège* 4533 (S). Maclear: Ugie, Kincardine, *Britten* 4530 (GRA). Mount Currie: Kokstad, *Haygarth* sub PRE 15815 (K), *Tyson* 1338 (BOL, PRE); near Cedarville, *Acocks* 21990 (PRE). Mqanduli: 'Morley' (? New Morley, near Mqanduli), *Drège* 4534 (S). Ngoeleni: Mlengana Cutting, between Umtata and St. Johns, *Bolus* 10315 (BOL). Port St. Johns: Between St. Johns and Umtata, *Flanagan* 2554 (PRE, SAM); between Umtata and Umzimvubu, *Drège* 4545 (P, S), Qumbu: near Tsitsa River, *Schlechter* 6365 (BOL, GRA, Z); 16 km S. of Qumbu, *Barker* 9167 (NBG); Qumbu-Umtata, *Bokelmann* (NBG). Tsomo: Tsomo, *Barker* (BOL 27907). Uitenhage: Uitenhage, *Zeyher* (K); Uanaga, *Long* 243 (K). Umtata: near Bazija, *Baur* 94 (B, BOL, GRA, K, SAM, Z); near Umtata, *Moss* 18084 (K), *McLaughlin* (BOL). Umzimkulu: Mt. Xava, near Clydesdale, *Tyson* 2803 (K, SAM), HAA 1202 (BM, BOL, G, K, SAM). Without precise locality: Tembuland, *Mason* (K—type of *G. masoniorum*). Stanford nursery (BOL—type of *G. stanfordiae*); *Bowker* s.n. (K).

LESOTHO.—Quthing district, *Dieterlen* 689 (GRA, K, P, SAM).

(b) var. **macowanii** (Bak.) Oberm. stat. nov.

G. macowanii Bak. in Handb. Irid. 219 (1892), Fl. Cap. **6** : 155 (1896). *Batten & Bokelmann*, Wild Flrs E. Cape Prov. t.27 f.3 (1966). Type: eastern Cape, Somerset East, Suurberg Mountain, Bosberg, *MacOwan* 236 (K, holo., BOL, G, GRA, S, Z).

G. massonii Klatt ex Dur. & Schinz, Consp. Fl. Afr. **5** : 220 (1893) nom. rej.

G. davisoniae Bol. f. in Ann. Bolus Herb. 2 : 98 (1917). Type: eastern Cape, near Somerset East, flowered at Kirstenbosch *De Courcy* (BOL 14762, holo.).

The flowers of this variety resemble those of *G. oppositiflorus* ssp. *salmoneus*, but the leaves are glabrous, ensiform, short and acute, whereas those of the latter are linear long-acuminate and minutely pubescent. The leaves moreover are evergreen, the new set of leaves developing beside those of the previous year. This trait is most pronounced in this variety. As there is no dormant period, practically no reserve food is stored in the corm and plants are therefore difficult to transplant. The large deep pink flowers may reach a length of c. 7 cm, the tube and lobes being usually of equal length. It is not as common as the typical variety; ranging from Somerset East to Barkly East on mountain slopes flowering from February to April.

CAPE.—Albany: Grahamstown, *Rogers* 27648 (K), *Pappe* (SAM); near Grahamstown, *Acocks* 14036 (PRE), *Archibald* 19 (RUH), *Baylis* 1349 (G, NBG), *Dyer* 2413 (BOL), *Mullins* (NBG); 13 km E. of Grahamstown on Peddie road, *Lewis* 4443 (SAM); 24 km from Grahamstown, near Heatherton Towers, *Dyer* 1394 (BOL, GRA, PRE); Atherstone, *Rogers* 3322 (BOL). Alexandria: Suurberg Mts., Olifantshoek Pass, between Cookhouse and Port Elizabeth, *Stayner* (NBG). Barkly East: Langkloof, top of Barkly Pass, *Reynolds* 2505 (PRE). Cathcart: 14 km N.W. of Toise River Station, *Acocks* 20250 (K, PRE); 29 km S. of Cathcart, *Theron* 1917 (PRE); 5 km S. of Thomas River, *Reynolds* 1174 (BOL); Cathcart, *Nicholls* (NBG). Elliott: Cala, *Kolbe* 72 (GRA); 37 km S. of Barkly East on Elliot road, *Nordenstam* 2006 (NBG). Glen Grey: Lady Frere, *Gerstner* 435 (PRE). Queenstown: mountains round Queenstown, *Galpin* 1799 (BOL, K, PRE). Somerset East: Suurberg Mt., Boschberg, *MacOwan* 236 (BOL, G, GRA, K, S, Z); Somerset East, *Harries*, NBG 295/32 (BOL); near Somerset East, *De Courcy* (BOL 14762—type of *G. davisoniae*). Stutterheim: Fort Cunyngame, above Huntwood, *Sim* 1916 (PRE); Thomas River, 25 km N. of Stutterheim, *Leach* 8839 (PRE). Wodehouse: 13 km S. of Dordrecht, *Reynolds* 3800 (PRE); Buffelsfontein, between Queenstown and Aliwal North, *Stretton* (NBG). Without precise locality: *Hutton* (K); *Ecklon & Zeyher* 153 (G).

When Baker described *G. macowanii* in the *Handbook of Irideae* in 1892 he stated that it had been originally gathered by Masson but he cited no specimens. In the description the segments are said to be 'all $1\frac{1}{2}$ in. broad'. This is obviously an error. Four years later in the *Flora Capensis* Baker published a reworded description amending the measurement of the segments to read $1\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad. He cited *G. secundus* Soland. in Herb. Banks as a synonym, and two specimens MacOwan 236 and Cooper 3600: but he did not cite a Masson specimen. There are in the British Museum two specimens from Masson named *Gladiolus secundus*. One of the two sheets of *G. cardinalis* collected by Masson is so named. There is another sheet named *G. secundus* β (manu Solander?) which Ker cited under his *G. milleri* in *Curtis's bot. Mag.* t.632. This sheet was seen by Lewis, who considered the specimen to be referable to *G. undulatus* L. Since there is no reason why Baker should have wished to distinguish between Masson's two specimens of *G. cardinalis*, it may be confidently assumed that his earlier reference to Masson and his citation of '*G. secundus*' both refer to this latter sheet: and this is supported by Baker's description of the tube as 2 in. long and his remark that his new species differs from the other *Cardinales* by having the segments shorter than the tube. The description seems to have been based on three elements, MacOwan's 236, collected in 1871 from the Bosberg above Somerset East, Cooper's 3600 which according to Lewis is referable to *G. saundersii* and Masson's '*G. secundus* β '

which according to Lewis is referable to *G. undulatus* L. The species might well be rejected as a *nomen confusum*; but in view of the name, it seems not unreasonable to select MacOwan's 236 as the lectotype, although the tube is never as much as 2 in. long and the flowers are not 'bright scarlet', but a deep pink drying to dark reddish brown. Whatever the validity of the name at specific level, it can be used, and is used here, as the varietal epithet.

Owing to the similarity of the name to *G. macowanianus* Klatt, previously published in 1885, a new name *G. massonii* was proposed by Klatt himself and published by Durand & Schinz in 1893. According to a recommendation in the *International Code of Botanical Nomenclature*, the use of the genitive and the adjectival form of the same name to designate two different species in the same genus, should be avoided. But as there is no compulsion to make any change when this has been done in the past, Baker's name may be retained.

Neuberia longifolia Eckl. Top. Verz. 37 (1827) was published without description for plants collected between Hottentots-Holland Kloof and Houhoek in November 1825. Subsequently Ecklon and Zeyher distributed under this name specimens of *G. ochroleucus* and the variety *macowanii* collected in the eastern Cape. Ecklon's original type has not been identified. *Neuberia longifolia* Eckl. is a *nomen nudum* and its transfer to plants from the eastern Cape is a mis-identification.

10. ***Gladiolus ecklonii*** Lehm., Delect. Sem. Hort. Hamb. 7 (1835). Type: Cape, Fort Beaufort, Katberg, *Ecklon & Zeyher* 162 (S, neo-type, B, C, G, PRE).

Plants 35–100 cm high. *Corm* subglobose, 1.5–5 cm in diam., with matted tunics of coarse brown fibres usually extending up into a neck 2–6 cm long; often bearing numerous basal sessile ovoid cormlets, 2 mm or more long. *Leaves* 6–10, variable in shape; those of ssp. *ecklonii* with the 4–6 basal broadly ensiform-acuminate blades forming a stiff spreading fan, lamina 16–24 cm long and up to 3 cm broad, base oblique, midrib acentral curving outwards, margin prominent, red or yellow, with several lateral ribs and finer secondary veins placed close together, 1–2 upper cauline leaves much reduced, usually bract-like; in the ssp. *vinoso-maculatus* and *rehmannii* the leaves are linear to narrow lanceolate, up to 70 cm long and up to 1.5 cm wide, firm, glaucous green, without a conspicuous margin. *Spike* secund, closely 6–14 flowered. *Bracts* imbricate, large, boat-shaped, 3.5–11 cm long, thin, glaucous green. *Flowers* small to medium sized, up to about 6 cm long, funnel-shaped, partly enclosed within the bracts, varying in colour; in the typical ssp. *ecklonii* and ssp. *vinoso-maculatus* the perianth lobes are densely spotted with red or maroon on a whitish background; in the ssp. *rehmannii* they are plain, pale mauve, greyish, pinkish or white; in all there is a green or yellow blotch on the lower lateral lobes. *Perianth tube* curved, broadly funnel-shaped, 1.2–3 cm long; *lobes* oblong to broadly ovate, the central upper lobe slightly hooded, the laterals somewhat larger, spreading, the 3 lower smaller, curved down- and outwards.

Stamens with short filaments and long linear anthers 10–15 mm long, just exerted from the mouth of the tube. *Style* finally just over-topping anthers. *Capsule* oblongo-ellipsoid, 1.5–3 cm long, reddish brown; *seeds* oblong-orbicular, broadly winged, 7 mm long, 5 mm wide.

A widespread, fairly common, variable species easily recognized by its large imbricate, boat-shaped bracts, recorded from the eastern Cape, Natal, Lesotho, Orange Free State, Transvaal and eastern Botswana, in grassland on rocky mountain slopes or on sandy flats, at altitudes ranging from near sea-level to 2 300 m, flowering in late summer, rarely earlier.

Three subspecies are recognized.

KEY TO SUBSPECIES

- Leaves ensiform, fairly short; plants about 35–50 cm tall; perianth speckled with red or maroon or rarely pink in some plants from eastern Transvaal; widely distributed from the Cape to the eastern Transvaal along the escarpment on grassy slopes (a) ssp. *ecklonii*
- Leaves linear, up to 70 cm long; plants up to 1 m tall; perianth plain or speckled; confined to the central Transvaal and eastern Botswana:
 Perianth speckled with maroon; recorded from the Highveld, on rocky grassy slopes (b) ssp. *vinoso-maculatus*
 Perianth plain or faintly speckled, white to pale mauve or pink; found on the Springbok Flats westwards to Botswana, usually in sandy habitats (c) ssp. *rehmannii*

(a) ssp. *ecklonii*

Gladiolus ecklonii Lehm., Delect. Sem. Hort. Hamb. 7 (1835) et Ann. Sc. Nat. ser. 2, **6** : 107 (1836); Klatt in Linnaea **32** : 712 (1863); Bak. in Curtis's bot. Mag. t.6335 (1877), Handb. Irid. 216 (1892), Fl. Cap. **6** : 151 (1896) excl. syn.; Dur. & Schinz, Consp. Fl. Afr. **5** : 216 (1893) excl. syn.; Phillips in Ann. S. Afr. Mus. **16** : 281 (1917); De Winter in Flower. Pl. Afr. **32**, t.1265 (1958); Batten & Bokelmann, Wild Flrs E. Cape Prov. t.30, 1 (1966). Trauseld, Wild Flowers of the Natal Drakensberg 45 (1969). Type: Plants raised in the Hamburg hortus from seeds received from Ecklon who had collected them in the E. Cape. Apparently no specimen preserved. *Ecklon & Zeyher* 162 (S, neo., PRE, B, C, G).

G. marmoratus Tausch, Flora **19** : 421 (1836); non Lamarck 1786. Type: Plants raised in the Vienna hortus from seeds collected by Ecklon; no specimen preserved. *G. inclusus* Bol. f. in Ann. Bolus Herb. **2** : 102 (1917). Type: Transvaal, Pilgrim's Rest, *Rogers* 14311 (BOL, holo.).

Plants usually 40–60 cm tall with short broad leaves and flowers about 5 cm long which are densely speckled with red, maroon or purple on a whitish background.

Fairly frequent in the eastern Cape, along the eastern escarpment to the eastern Transvaal, where it becomes more varied in flower colour and appearance.

FIG. 3. From a painting by Cythna Letty. *Flower. Pl. Afr.* t.1265 (1958). Leaf; top of inflorescence, corm.

Transvaal.—Pilgrim's Rest, Graskop, *Galpin* (PRE 28634). 1937.



FIG. 3. *G. ecklonii* subspecies *ecklonii*.

CAPE.—Flagstaff: near Fort William, *Tyson* 2811 (SAM). Fort Beaufort: Koonap River, Fort Beaufort, *Murray* 520 (K). Kentani: Kentani, *Pegler* 737 (BM, BOL, K, PRE). Komga: Komga, *Flanagan* 3558 (G), s.n. (Z); near Kei Mouth, *Flanagan* 501 (BOL, GRA, PRE, SAM). Lusikisiki: 14 km S. of Lusikisiki, *Codd* 9310 (K, PRE); Magwa Falls, *Lewis* 1846 (SAM). Mount Currie: Mount Currie, *Tyson* 1795 (BOL, G, GRA, K, PRE, SAM); near Kokstad, *Acocks* 2200 (PRE), *Bokelmann* (NBG). Mqanduli: Mqanduli, *Codd* 9267 (BOL, GRA, K, PRE); Old Morley, *Drège* 4534 (LE). Stockenström: Katberg, *Harvey* 35 (K, S), *Ecklon & Zeyher* 162 (B, C, G, PRE, S), *Galpin* 2082 (GRA, PRE), *MacOwan* 3110 (SAM); Islandriver, *Ecklon & Zeyher* 183 (P). Stutterheim: near Toise River Station, *Flanagan* 2307 (PRE); Kabusie, *Murray* 520 (GRA, K); Dohne Peak, *Acocks* 9674 (PRE); Fort Cunyngame, above Huntwood, *Sim* 1915 (PRE). Umtata: Bazija, *Baur* 141 (GRA, K, SAM), s.n. (BM, Z); Umtata, *Drège* 4534 b (LE, P). Victoria East: Hogsback, *Wilson* (NBG), *Bokelmann* (NBG).

ORANGE FREE STATE.—Hartismith: Rensburgskop, Swinburne, *Jacobsz* 503, 504 (PRE), s.n. (NBG). Without precise locality: *Cooper* 3194 (K); Drakensberg, *Cooper* 1040 (BM, K, PRE, Z), 3198 (K, Z).

LESOTHO.—Qacha's Nek, *Brooke* 2 (BM). Without precise locality: *Bowker* (K).

NATAL.—Bergville: Cathkin Peak, *Galpin* 11874 (K, PRE), *Howlett* 101 (K, L, PRE, UPS); Tugela River, *Allison* (K); Tugela valley, *Bayer & McLean* 235 (PRE); Natal National Park, *Trausdel* 153 (PRE). Dundee: Biggarsberge, *Kuntze* (K), *Wood* 4712 (K). Estcourt: Highlands, *Schlechter* 6853 (BOL, GRA, PRE, Z); Giant's Castle, *Symons* 428 (BOL, PRE); Cathedral Peak Forest Reserve, *Killick* 1449 (PRE). Helpmekaar: 24 km N.W. of Helpmekaar, *Codd* 6784 (K, PRE). Kranskop: Insizwa ? (probably Ntshiza), *Krook* in herb. *Penther* 651 (BM, Z). Ladysmith: Van Reenen, *Wood* 5547 (BM). Lions River: near Mountain Glen Farm, *Dargle*, *Taat* 1358 (PRE); Karkloof, *Rycroft* 2398 (NBG). Nkandla: Nkandla, *Gerstner* 608 (PRE). Polela: near Polela River, *Beus* 6 (PRE). Umvoti: Greytown district, *Wylie* 22372 (K, NH, PRE). Umzinto: Dumisa, *Rudatis* 622 (BM, K, PRE). Underberg: Bushmansnek, *Germishuizen* 70 (K, PRE); Coleford Nature Reserve, *Sidey* 3942 (PRE). Utrecht: Klipspruit, *Breyer* sub TRV 16958 (PRE). Vryheid: Vryheid, *Galpin* 9753 (K, PRE). Weenen: Culvers, *Rogers* 27787, 30317 (Z); N.E. foot of Hlatikulu Mt., *Acocks* 10178 (PRE). Without precise locality: *Sutherland* (K); *Gerrard* 1532 (BM).

TRANSCAAL.—Barberton: Barberton, *Rogers* 30135 (G, K, S, Z); Abbots Hill, Barberton, *Galpin* 864 (K, GRA, PRE). Belfast: Belfast, *Burt* *Davy* 1321 (PRE), *Van der Merwe* 1263 (PRE), *Hutchinson* 2784 (BOL, K); Dullstroom, *Galpin* 12227 (PRE), 13640 (BOL, K), *Reynolds* 5840 (K, PRE); ditto, Suikerboskop, *Galpin* 12228 (PRE), NBG 254/33 (BOL); Mashonamini, Airlic, *Cross* 88 (NBG). Carolina: Waterval-Boven, *Rogers* 14448 (PRE), *Burt* *Davy* PRE 1456 (BOL, PRE). Ermelo: Lake Chrissie, *Flakfontein*, *Pole Evans* 1057 (K, PRE); Lochiel, *Pole Evans* 1058 (BM, K); Ermelo, *Leendertz* sub TRV 7790 (PRE); 8 km E. of Vosman's Beacon, *Codd* 6388 (PRE). Letaba: Woodbush, *Wager* (LD); The Downs, *McNeil* (NBG), *Cruddall* (PRE). Lydenburg: Sabie Valley, *Galpin* 13578 (K, PRE); near Lydenburg, *Obermeyer* 358 (PRE), *Wilms* 1435 (AMD, BM, G, K, L, P, PRE, Z). Nelspruit, slopes of Amajuba Mt. Schagen, *Liebenberg* 3112 (PRE). Pietersburg: Houtbosch, *Rehmann* 5777 (BM, K, Z), *Bolus* s.n. (BOL); Haenertsburg, *Pole Evans* PRE 3956. Piet Retief: Iswepe, *Sidey* 1566 (S). Pilgrim's Rest: top of Mauchsberg, near Sabie, *Van der Merwe* 1663 (K, PRE); Graskop, *Galpin* 14327 (BOL, PRE), s.n. (BOL, PRE), 14321 (K); *McNeil* (NBG); Blyde Pools, near Graskop, *McNeil* (NBG); between Graskop and Kowyn's Pass, *Reynolds* 3993 (K, PRE); Mt. Anderson, *Galpin* 13577 (BOL, PRE); Twefontein, near Sabie, *Brent* 13 (PRE); Pilgrim's Rest, *Rogers* 14600 (BOL, Z). Wakkerstroom: Wakkerstroom, *Galpin* 10012 (K, PRE); Oshock, *Devenish* 558 (K, PRE). White River: Kruger National Park, between Crocodile Bridge and Skukuza, *Cholmondeley* 3 (PRE).

SWAZILAND.—Forbes Reef: Forbes Reef, *Bayliss* 2066 (NBG). Hlatikulu: Hlatikulu, *Stewart* 28 (K, SAM); near Hlatikulu, *Compton* 26385 (NBG). Mbabane: Mbabane, *Rogers* 11588 (K, GRA, PRE); near Mbabane, *Compton* 25033 (NBG); Forbes Reef Road, *Compton* 25663 (NBG).

WITHOUT LOCALITY: *Tausch* (LE).

G. ecklonii was first described in 1835 from plants raised in Hamburg from seed originally collected in South Africa by Ecklon but Lewis was not able to trace the type in the Hamburg herbarium, nor any of those visited in 1965. Dr K. Walther, the present director of the Hamburg Botanic Garden and Herbarium, had informed her that although J. G. C. Lehmann, the author of the species, was director of the Garden from 1821 to 1860, there was no herbarium there at that time and after his death all his specimens were sold to a number of botanists, mostly private. One of Ecklon & Zeyher's specimens in the Natural History Museum Herbarium, Stockholm, was therefore selected as a neotype.

G. marmoratus Tausch, published a year later, was also described from plants raised from seed collected by Ecklon, and is the same species. She did not see the type of this either—it was probably in Vienna and destroyed during the last war—but among a number of specimens sent to Kew for her to examine from the herbarium of the Botanical Institute of Leningrad was one of Tausch's named *G. marmoratus*, dated 1843. In his works on *Gladiolus* Baker did not refer to *G. marmoratus* Tausch, which is a later homonym of *G. marmoratus* Lam. (= *Watsonia roseo-alba* (Jacq.) Ker). It was incorrectly cited as a synonym of *Lapeirousia juncea* Pourr. by Baker. The only synonyms the latter cited under *Gladiolus ecklonii* were *Neuberia longifolia* Eckl. and *Gladiolus carneus* Klatt, but these must be omitted as they are not this species (see note under *G. ochroleucus*).

G. ecklonii extends over a large part of the country and, as is to be expected of a species with so wide a distribution, it is extremely variable. Distinguishing characters are the way in which the leaf blade arises somewhat obliquely from the sheathing base, with the midrib distinctly curved at the base and conspicuous prominent margins, usually pale but sometimes reddish brown and occasionally with the edges rough to the touch, and the short-tubed, densely speckled flowers emerging from comparatively large-keeled bracts and partly concealed by them. The perianth lobes are rounded and the stamens are only just exerted from the perianth tube.

Variations from the typical form are found in collections from the eastern Transvaal, which is not unusual since this fertile area with its rich flora has given rise to many endemic species and aberrant forms of more stable neighbouring species. Here the leaves are mostly fairly narrow, but even in the same area and in other parts of the country they have been found to vary from very short and broad, sometimes almost oblong, to slightly longer, much narrower and more or less lanceolate. Specimens collected at high altitudes, e.g. Mount Anderson, are much reduced in stature, have fewer narrower leaves and bear fewer paler coloured, often pink flowers. This may be a result of crossing with *G. exiguus*. Some specimens from the Lowveld bear perianth lobes that are acuminate and also pink.

Dr A. Jacot Guillarmod records that the flowers are eaten raw or as a pot-herb in Lesotho [cf. Bot. Not. **119** : 212 (1966)].

(b) ssp. **vinoso-maculatus** (Kies) Oberm., stat. nov.

G. vinoso-maculatus Kies in Flower. Pl. Afr. **29**, t.1123 (1952). Verdoorn in Letty, Wild Flow. Transv. t.40 f.1 (1962). Type: Transvaal, Pretoria, Waverley, Magaliesberg, *Wasserfall* (PRE 28299, holo., K).

The appearance of this subspecies is more lax; it is taller and has longer linear leaves while the fibrous neck above the corm is usually absent. It is found on grassy rocky slopes in and around Pretoria as far west as the Hartbeespoort Dam in the Magaliesberg; further east it is recorded from the Highveld as far as the Middelburg district, flowering from January to March.

TRANSVAAL.—Bronkhorstspuit: Renosterkop, *Young* 2151 (PRE), 2152 (K, PRE); Baviaanspoort, *Connel* 51 (PRE); Trigardspoor, Erasmus, *Repton* 1216 (BOL, K, PRE), *Meeuse* 9251 (PRE); Premier Mine, *Rogers* 19878 (BOL, K, Z). Middelburg: near Middelburg, *Dyer* 3932 (K); Botsabelo, *Thode* 5109 (STE); Buffelsvlei, *Rudatis* 123 (STE); Roosenekal, *Sankey* 11 (BOL). Pretoria: Waverley, Magaliesberg, *Wasserfall* in PRE 28299 (K, PRE); Wolhuterskop, *Pole Evans* in PRE 19015, 19016 (PRE); road to Daspoort, *Leendertz* 576 (BR, L); Hornsnek, *Schlieben* 7822 (B, G, K, Z), *Codd & Kies* s.n. (PRE); Pienaarspoort, about 27 km E. of Pretoria, *Brent* 137 (K, PRE). Witbank: Olifants River, *Codd* 3675 (PRE).

(c) ssp. **rehmannii** (Bak.) Oberm., stat. nov.

G. rehmannii Bak., Handb. Irid. 216 (1892), Fl. Cap. 6 : 153 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 223 (1893); Pole Evans, Flower. Pl. S. Afr. 1, t.20 (1921). Type: Transvaal, Bronkhorstspuit district, between Elands River and Klippan, *Rehmann* 5096 (K, holo.). *G. cymbarius* Bak. in Bull. Herb. Boiss. ser. 2, 1 : 866 (1901). Type: from the same locality as *G. rehmannii*, *Rehmann* 5100 (Z, holo., NBG, PRE, photo).

This subspecies is rather taller than the typical subspecies and its flowers lack the deep maroon spotting, but the typical large, imbricate, boat-shaped glaucous bracts reveal its close affinity. The plain, or faintly speckled perianth varies from whitish to pale mauve and shows the typical yellow area on the lower lateral lobes. Its distribution is on the Springbok Flats from the northern part of the Pretoria district to Botswana, in the Kwena district, in a sandy habitat and it usually flowers in March.

TRANSVAAL.—Bronkhorstspuit: between Elands River and Klippan, *Rehmann* 5096 (K), 5100 (Z—type of *G. cymbarius*); near Sybrandskraal on road to Witbank, *Codd* 2073 (PRE). Ermelo: Lake Chrissie dist., *Pole Evans* 1058 (PRE). Potgietersrus: Potgietersrus, *Melle*, NBG 168/23 (BOL). Warmbad: near Warmbad, *Burt Davy* 2347 (PRE), *Sidey* 1445 (S); Warmbad, Tuinplaas, *Mauve* 4040 (PRE); 6 km from Warmbad on Nylstroom road, *Codd & Muller* 348 (PRE). Waterberg: Nylstroom, *Pole Evans* in PRE 13488 (K, PRE), s.n. (BOL, K); 24 Rivers, 21 km E. of Vaalwater, *Codd* 926 (PRE, UPS); Springbok Flats, *Burt Davy* 2347 (BOL); Nootgedagt, *Acocks & Naude* 61 (PRE); 16 km N. of Nylstroom, *Van der Wal* (PRE).

A rather stiff but attractive plant, first found by Rehmann between 1875 and 1880, then lost sight of until it was rediscovered in 1917 by Dr Pole Evans and figured by him three years later in the first volume of *Flowering Plants of South Africa*. In a letter written at that time to Dr L. Bolus he stated that it appeared to be extremely local, occurring on light sandy soil, and added: 'In a small patch of ground about an acre in extent there were literally thousands of these plants making the veld quite white from a distance.'

The type is in Kew Herbarium and in the Zürich University herbarium in Switzerland there is another plant with a different number collected by Rehmann in the same area, which Baker later described as *G. cymbarius*. On examination this proved to be exactly the same as *G. rehmannii*.

G. dalei Van Geel the correct name

11. **Gladiolus natalensis** (Eckl.) Reinw. ex Hook. in Curtis's bot. Mag. sub t.3084 (August 1831); Lodd., Bot. Cab. t.1756 (December 1831); D. Don in Sweet, Brit. Flow. Gard. ser. 2, t.281 (1835) and Ornam. Flow. Gard. 4, t.230 (1854); Loudon, Ladies Flow. Gard. Ornam. Bulb. Pl. t.13 (1841), in textu of Hilliard + Burt in Notes Roy. Bot. Gard. Edinb. 37: 297-299 (1979)

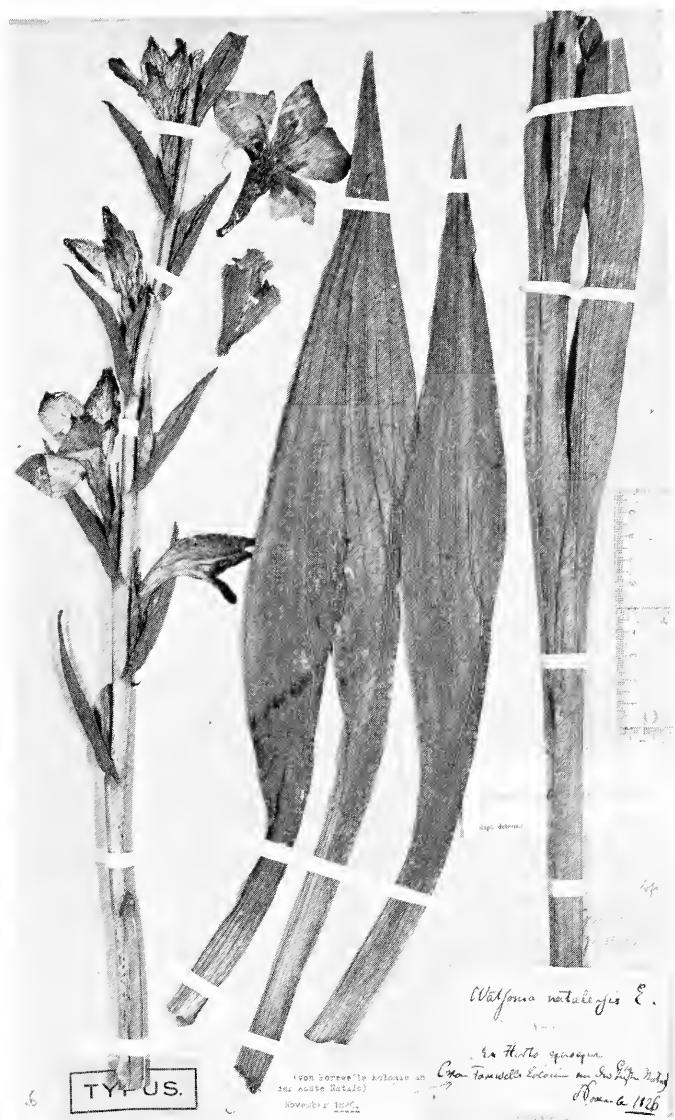


FIG. 4. Type of *G. natalensis* (Eckl.) Hook (S).

Photo: By courtesy of Prof. T. Nordlindh, Stockholm.

'*G. psittacinus* Hook. '; Klatt, in Abh. Naturf. Ges. Halle **12** : 343 (1882), Ergänzt. 9 (1882). Dur. & Schinz, Consp. Fl. Afr. **5** : 221 (1893) as '*G. natalensis* Sweet'. Type: Natal, 'from Farewell's Colony on the coast of Natal' ex hort. J. J. B. Smuts, Cape Town, November 1826, comm. *Ecklon* (S, holo., PRE photo.). (See fig. 4.)

Watsonia natalensis Ecklon, Top. Verz. 34 (1827). Type: as above.

→ *G. daleni* Van Geel in Sert. Bot. **1**, t.18 (1829?). Reicheb. Fl. Exot. **2**, t.116 (1834), in textu *G. psittacinus*. Type: Natal, Sert. Bot. t.18 (iconotype); from plants flowered at Rotterdam, June 1828. *G. psittacinus* Hook. in Curtis's bot. Mag. t.3032 (1830); Lindley in Bot. Reg. t.1442 (1831); Bak., in J. Linn. Soc. **16** : 61 (1877); Handb. Irid. 220 (1892), Fl. Cap. **6** : 158 (1896). Phill. in Ann. S.A. Mus. **16** : 282 (1917). Type: ex hort. Harrison, Liverpool, from corms received from Salm Dyck, flowered in the summer and autumn 1830 (K, holo.). var. *cooperi* Bak., Handb. Irid. 220 (1892), Fl. Cap. **6** : 158 (1896); Phil. in Flower. Pl. S. Afr. **1**, t.6 (1921). Type: as for *G. cooperi* Bak. *G. dracocephalus* Hook. f. in Curtis's bot. Mag. t.5884 (1871); Bak. in J. Linn. Soc. **16** : 176 (1877); Handb. Irid. 220 (1892); Dur. & Schinz, Consp. Fl. Afr. **5** : 216 (1893); Bak. in Fl. Cap. **6** : 157 (1896). Trausel, Wild Flowers of the Natal Drakensberg 45 (1969). Type: Natal, at the foot of the Drakensberg Mountains in the west of Natal, *Cooper* 3593, cultivated at Kew (K, holo.). *G. cooperi* Bak. in Curtis's bot. Mag. t.6202 (1875). Type: Natal, *Cooper* ex hort. Kew (K, holo.). *G. adlami* Bak. in Gard. Chron. ser. 3, **5** : 233 (1880), Handb. Irid. 219 (1892), Fl. Cap. **6** : 156 (1896). Type: Transvaal, *Adlam* ex hort. Cambridge, (K, holo., PRE, NBG, photo.). *G. antholyzoides* Bak. in J. Bot., Lond. **29** : 70 (1891), Handb. Irid. 227 (1892); Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893); N.E. Br. in Trans. R. Soc. S. Afr. **20** : 267 (1932). Type: Transvaal, in damp ground near Pretoria, *Elliott* 1447 (K, holo.). *G. tysoni* Bak., Handb. Irid. 220 (1892), Fl. Cap. **6** : 158 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 226 (1893); Batten & Bokelmann, Wild Flow. E. Cape Prov. t.29 f.5 (1966). Type: eastern Cape, Griqualand East, near Fort Donald, *Tyson* 1653 (K, holo., SAM). *G. platyphyllus* Bak. in Gard. Chron. ser. 2, **14** : 456 (1893), Fl. Cap. **6** : 157 (1896); Batten & Bokelman, Wild Flow. E. Cape Prov. t.29 f.1 (1966). Type: Cape, Transkei, lower Kei River, *Flanagan*, cult. in hort. Leichtlin (K, holo.). *G. fuscoviridis* Bak. in Fl. Cap. **6** : 530 (1897). Type: a cultivated specimen of unknown origin, flowered at Kew, July 1896 (type not located at Kew, fide Lewis). *G. brachylimbus* Bak. in Viert. Nat. Ges. Zürich **49** : 178 (Opusc. Bot. **12** : 178, 1905). Type: Transvaal, Pretoria, Magaliesberg near Apies River, *Schlechter* 3627 (sphalm. 3629), (Z, holo.). *G. magaliesmontanum* Bol. f. in Ann. Bolus Herb. **2** : 108 (1917). Type: as for *G. brachylimbus* Bak. *G. vogtsii* L. Bol. in J. Bot., Lond. **67** : 133 (1929). Type: Transvaal, without locality, *Vogts* (NBG 617/28, BOL, holo.). *G. pageae* L. Bol. in S. Afr. Gdng Ctry Life **18** : 213–14 (1928), J. bot. Soc. S. Afr. **14**, t.3 (1928). Type: Lesotho, near Thaba Tseueu, *Page* (BOL 17030, holo.). *G. leptophyllus* L. Bol. in S. Afr. Gdng Ctry Life **22** : 204 (1932). Type: Transvaal,

Blouberg, *Neethling*, comm. Grosskopf, flowered in Stellenbosch University Garden, SUG 856 (BOL, holo.). *G. retrocurvus* Lewis in S. Afr. Gdng Ctry Life **22** : 204-5 (1932). Type: Transvaal, Letaba district, Selati Estate near Rubbervale, collector unknown, NBG 1361/30 (BOL, holo.).

Antholyza laxiflora Bak. in Fl. Cap. **6** : 170 (1896), nom. nov. for *Gladiolus antholyzoides* Bak. Type: as above. *A. schlechteri* Bak. in Bull. Herb. Boiss. ser. 2, **4** : 1007 (1904). Type: as for *G. brachylimbus* Bak.

Corm globose to depresso-globose, 2-5 cm in diam., covered with soft brown fibres, producing at times numerous cormlets appressed to the mother corm, the latter also dividing into 2-3 daughter corms, and/or giving rise to a few fairly large cormlets at the ends of runners up to 30 cm long. *Leaves* with 2-4 basal tubular prophylls, and 5-12 distichous ascending leaves arranged in a fan; lamina linear to broadly ensiform, the narrower leaves usually longer, up to 60 cm long and 1-3 cm broad, the ensiform shorter, up to 30 cm long and 4-5 cm broad; blade fairly soft with a few prominent ribs, very rarely puberulous. *Spike* up to 1-1,5 m high, occasionally with a short branch at the base, firm, many- (up to 25-) flowered, about 3-6 open at a time; scape stout, terete; bracts clasping the rhachis or free and clasping the perianth tube, boat-shaped, acuminate, 9-3 cm long, membranous, green or tinted with yellow, brown or red. *Flowers* secund during anthesis, distichous in bud and in fruit; perianth distinctly zygomorphic, with the upper segments large, hooded or sub-erect, the lower about one-third the size of upper, recurved, variously coloured, streaked and mottled in combinations of green, brown, orange, yellow and red, or plain orange-red and/or yellow, the lower lobes usually lighter coloured in the middle; tube curved, 2-5 cm long, expanding gradually, about as long as the limb, occasionally longer or shorter; upper lobes about equal in size, ovate to obovate, apiculate, 3-5 cm long, the laterals appressed to the central lobe or spreading in upper half; lower lobes lanceolate, acuminate, recurved, the central about twice the size of the laterals which are placed above it, the central area differently coloured. *Capsule* cylindrical to turbinate, obtusely triangular in cross-section, about 3 cm long and 1 cm broad, chartaceous to slightly woody, closely and obliquely nerved, in the axils of the enveloping bracts, the latter gaping at maturity; seeds ovate to obovate or rounded, 1 cm in diam., with a broad membranous shiny papillate wing, golden brown.

This very widespread variable taxon is found from the eastern Cape northwards through tropical Africa to Abyssinia and western Arabia, in the steppe and savannah regions from sea-level to the higher mountain slopes. A critical survey of the species throughout its range might lead to the recognition of several taxa of subspecific rank. This cannot be attempted here. The South African ecotypes have received a number of specific and subspecific names, as can be seen from the above list of synonyms. The differences are slight and, with the increased collecting of recent years, even the more distinct forms are

found to be linked by intermediates. The taxon is therefore treated as a single species.

Within our area the species is summer-growing, the various ecotypes flowering from late September to April and May.

- CAPE.—Albert: *Cooper* 689 (PRE). Bizana: between Umtentu and Umzimkulu rivers, *Drège* 4544 (S). Fort Beaufort: Katberg, *Andrew Smith* in herb. Galpin 1761 (PRE). Kentani: *Pegler* 256 (BM, PRE). Komga: near Komga, *Flanagan* 1048, 2247 (PRE). Matatiele: Ongeluknek Pass, *Acocks* 22192 (PRE). Mount Currie: Kokstad, *Tyson* 1479 (PRE). Umtata: Mt. Baziya, *Baur* 461 (K); near Baziya, *Baur* (G).
- NATAL.—Bergville: Oliviershoek Pass, *Werdermann & Oberdieck* 1478 (PRE); Royal Natal National Park, *Trauseld* 151 (PRE); Cathedral Peak, near Cathedral Peak Hotel, *Codd & Dyer* 6253 (PRE); Champagne Castle, *Bayer* 1219 (PRE). Camperdown: Botha's Hill, *Wood* 4819 (K). Durban: Isipingo, frequent at edge of swamp, *Ward* 594 (PRE); common in open disturbed area, amongst grasses, flow. November; *Ward* 3771 (PRE); Amanzimtoti: Warner Beach, *Olivier* (NBG 85896, with stolons). Estcourt: Giant's Castle Game Reserve (Witteberg area), *Trauseld* 890 (PRE); *Symons* 204 (PRE). Helpmekaar: near Helpmekaar, *Codd* 6785 (PRE). Howick: 8 km N. of Howick, *Bayer* (NBG). Inanda: Inanda, *Wood* 422 (K). Lions River: near Nottingham Road, *Acocks* 13946 (PRE), *Sidey* 3664 (PRE). Pietermaritzburg: 2 km N. of Lidgetton, *Reynolds* 3724 (K), *Herbst* (NBG). Umzinto: Umzinto-Umlazi, Ilfracombe, *Bayliss* 2205 (NBG; with stolons). Underberg: Bushmansnek, *Germishuizen* 65 (PRE), Highmoor Forest Station, *Killick & Vahrmeyer* 3576, 3587 (PRE). Utrecht: 10 km N.E. of Utrecht on road to Wakkerstroom, *Codd* 2514 (PRE). Vryheid: Lancaster Hill, summit amongst rocks, *Galpin* 9755 (K, BR, PRE). Weenen: Culvers, *Rogers* 28324 (BOL).
- LESOTHO.—Leribe: *Dieterlen* 454b, 454a (PRE). Mafeteng: Emmaus, *Gerstner* 280, *Watt & Van Brandwyk* 1594 (PRE). Mahlatsas, *Jacot Guillarmod* 446 (PRE). Mamathes, *Jacot Guillarmod* 555, 2569 (PRE).
- ORANGE FREE STATE.—Bethlehem: Golden Gate National Park, *Roberts* sub PRE 3393 (PRE). Ficksburg: Kirklington, *Codd* 10545 (PRE). Fouriesburg: Wyndford, *Gemmell* BLFU 6033 (PRE). Harrismith: Harrismith, *Sankey* 287 (K), *Phillips* 3500 (K, PRE). Kroonstad: *Wagner* in herb. Marloth 13546 (PRE). Winburg: Allemanskraal about 24 km N.E. of Winburg, *Feinauer* (NBG). Without precise locality: Vet and Riet rivers, *Burke* (K, BM, SAM).
- TRANSSVAAL.—Barberton: Lomati Valley, *Galpin* 1192 (PRE). Belfast: *Leendertz* sub TRV 7958 (PRE); 10 km N.W. of Belfast, *Reynolds* 2701 (PRE). Johannesburg: Modderfontein, *McLean* s.n. (PRE); Linksfield Ridge, *Prosser* 1858 (PRE). Krugersdorp: Jack Scott Private Nature Reserve, *Wells* 2482 (PRE); Krugersdorp, *Jenkins* sub TRV 10550 (PRE). Letaba: Woodbush, *Hutchinson* 2268 (BM, K, PRE); Soekmekaar, *Rogers* 22597 (K, PRE). Machadodorp: *Galpin* 12508 (PRE). Middelburg: near Stoffberg, *Codd* 9845 (PRE). Piet Retief: Iswepe, *Sidey* 1588, 1974 (PRE, S). Pilgrim's Rest: Acornhoek, *Roberts* TRV 28224 (PRE). Pretoria: Meintjeskop, *Tölken* s.n. (PRE), Silverton, *Smith* 1090 (PRE). Rustenburg: Rustenburg, *Van Dam* sub TRV 16527 (PRE). Soutpansberg: Hangklip near Louis Trichardt, *Govt. Forester* (NBG 1080/62). Wakkerstroom: Wakkerstroom, *Van der Merwe* 31 (PRE, LD), *Galpin* 9884 (PRE). Waterberg: near Groothoek, 8 km S. of Kransberg, *Meeuse & Strey* 10406 (PRE, S, UPS). White River: Kruger National Park, *Van der Schijff* 3009 (PRE).
- SWAZILAND.—Stegi: Stegi-Big Bend road, *Compton* 27336 (PRE); Manzini, Mahlabana Spruit, *Burt Davy* 2934 (PRE).
- MOZAMBIQUE.—Delagoa Bay: *Junod* 131 (BR, G, Z).
- SOUTH WEST AFRICA.—Okavango Native Territory: 10 km W. of Tondoro Mission Station, *De Winter & Marais* 5003 (PRE). Grootfontein: beside road 16 km E. of Runtu, *Mersmueller* 1917 (PRE, M), Okavango Native Territory: in bush near Andara Mission Station, *De Winter & Marais* 4779 (PRE), yellow form. E. Caprivi Strip: 32 km from Katima on road to Linyanti, *Killick & Leistner* 3111 (PRE), yellow form.
- BOTSWANA.—Ngamiland: *Curson* 15 (PRE), yellow form.

Corms of the type were probably brought to Cape Town from the Natal coast after Farewell's first landings there in 1823 or 1824. Ecklon saw a plant in flower in Mr Smuts's garden in Cape Town in November 1826. He wrote an enthusiastic description of this plant which was published in his *Top. Verz.* at the end of 1827. He claimed that its beauty surpassed that of all other indigenous species known to him, comparing the colour of the flowers to that of *Tigridia pavonia* the orange changing to red speckled with yellow. He remarked that its habit was that of *Watsonia*, in which genus he placed it, but that the



Pl. 7.

G. papilio

Species 12



flowers resembled *Gladiolus*. He even suggested that the plant had a lilac-like scent; but no one else has ever recorded noticing a scent in the type or in any other form of the species. Early in 1827 Ecklon sent the MS. of the *Top. Verz.* and his first collection of botanical specimens to the Unio Itineraria at Esslingen. Whether he was in any way responsible for sending the first corms of his 'Watsonia' to Europe is doubtful.

According to Van Geel, Dr Dalen of Rotterdam received corms from the environs of Port Natal in 1827, which flowered in the summer of 1828. Dr Dalen, presumably Cornelius Dalen then Director of the Rotterdam Botanic Gardens, had an illustration made, which Van Geel reproduced in the first volume of his *Sertum Botanicum*. The title page of this volume is dated 1828 but it may not have been completed until the following year. Van Geel's *G. daleni* must however have been published before December 1830, in which month Hooker described the species in the *Botanical Magazine* under the name of *G. psittacinus*. Hooker's flowering material had come from Mr Harrison of Liverpool and the story behind it makes amusing reading. Referring to Harrison's observation on the splitting of the corm and the ample spawn produced, Hooker continued as follows: 'These, we will venture to say, will be distributed with a liberality very different from the line of conduct pursued by the gardener at Leyden in Holland, where Mr. Harrison first saw the plant, and who, upon this gentleman's expressing a wish to possess a bulb, offered to send him one "when he should have received a collection of Orchidaceous plants from Mr Harrison". Such a want of confidence toward a well-known horticulturist could not impress our friend with a very favourable opinion of the possessor of this charming *Gladiolus*, and of course he declined all further communication with him. On his return, no sooner were Mr. Harrison's wishes made known to Mr. Hitchin, than he wrote to his friend and fellow-cultivator of Succulents, the Prince De Salm-Dyck for a bulb of *Gladiolus psittacinus* and it was forwarded to Mr Harrison forthwith.' The sequel to this story is found in a short note below the text of *Anthericum plumosum* in the *Botanical Magazine* t.3084 August 1831. It reads as follows: 'We here take the opportunity of remarking, that the *Gladiolus psittacinus*, published on t.3032 of this work should bear the name of *G. natalensis* (it being a native of the shores of the Natal River, Cape of Good Hope) given to it by Professor Reinwardt of Leyden; who introduced it to Europe and who, we know, has distributed this splendid plant with great liberality.'

In this brief apology for the remarks he had made about the Leiden Gardens the previous year, Hooker accepted Reinwardt's unpublished combination and his claim that he had first introduced it to Europe. Reinwardt may have received corms at the same time as Dr Dalen in 1827. He may possibly have received them earlier. During his visit to Cape Town in 1816 Reinwardt had made contact with residents and collectors there; notably with Ecklon's employer the apothecary Polemann, who did so much for the furtherance of South African botany. Whatever the truth about the first importation of the

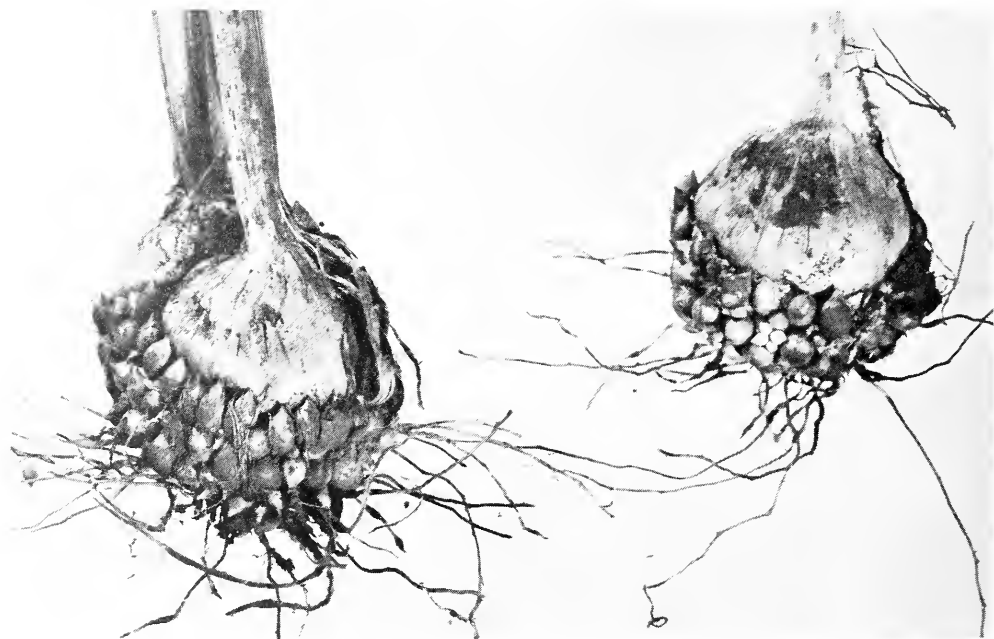


FIG. 5. Corms of *G. natalensis* showing spawn. (Wells 2482, PRE).

Photo: National Herbarium, Pretoria.

species to Europe, it was very soon widely distributed, for the corms divide readily and produce large quantities of small cormlets as can be seen from figure 5. Loddiges saw them in flower at Leiden in 1830 and acquired corms, under Reinwardt's name of *G. natalensis*, which he flowered the following year and published in his *Botanical Cabinet* in December 1831, four months after Hooker's apology. In that year also Lindley received specimens from Lee the Hammersmith nurseryman, and also from Miller of Bristol and illustrated and described them under Hooker's earlier name of *G. psittacinus*. Subsequently Hooker's name received general recognition. Although Klatt (1882) restored *G. natalensis* Reinwardt MSS. citing Ecklon's basionym of *Watsonia natalensis*, Baker and others continued to use *Gladiolus psittacinus* and this name has persisted until recently. Under the present International Rules the name must be changed and Ecklon and Reinwardt's epithet restored.

Not long after its introduction, this spectacular new garden plant was used for hybridizing. The first recorded hybrids were raised by M. Bedinghaus, head gardener to the Duc d'Arenberg in 1837. Some of these were purchased

by Van Houtte of Ghent, who distributed them under the name of *Gladiolus gandavensis*, claiming that the other parent had been *G. cardinalis*. But the illustrations of the early 'gandavensis' hybrids show no trace of *cardinalis* influence and Dean Herbert and later commentators are no doubt correct in believing that *G. oppositiflorus* was the main, if not the only, other species concerned.

These early 'gandavensis' hybrids showed great variability and were developed by several breeders, notably by Souchet, gardener to Napoleon III at Fontainebleau. After 1870, new colours and new flower forms were achieved by crossing with other summer-flowering species, *G. papilio* and its form 'purpureo-auratus', *G. saundersii* and *G. cruentus*. At this period also other ecotypes of *G. natalensis* were introduced. The yellowish *G. cooperi* and the dusky maroon and green *G. dracocephalus* were of passing interest to hybridists. It was the introduction c. 1902 of the slender clear yellow form from the Victoria Falls that allowed hybridists to make a whole new race of garden Gladioli, the so-called 'Primulinus hybrids'. These yellow forms of *G. natalensis*—*G. primulinus* Bak. (Tanzania); *G. nebulicola* Ingram from the Victoria Falls; *G. xanthus* Lewis (northern Zambia) occur within our area in the Okavango Territory, the Caprivi Strip and northern Botswana. Only the Victoria Falls form has been established in cultivation.

Among the various ecotypes of *G. natalensis* which occur within our area mention must be made of the tall, late-flowering stoloniferous plants that occur in northern Zululand and Mozambique. From one or other of these populations was collected a *Gladiolus* that is now widely spread in cultivation not only in South Africa but throughout the milder temperate regions of the world. The actual locality from which this cultivar was collected is unknown and no exact match for it has been recorded from such populations as have been examined.

Gladiolus natalensis Hook. cultivar **Hookeri**; *G. psittacinus* var. *cooperi* sensu Wood & Evans, Natal Plants 1 : t.99 (1899); *G. psittacinus* Hook. sensu Phillips in Flower. Pl. S. Afr. t.116 (1923); '*G. psittacinus* var *Hookeri*' Stanford, A Garden of S. Afr. Flowers 45–6 (1949): and in catalogues from her Bloemhof Garden (1929–50). Type: a cultivated specimen from the Benoni Municipal Park (PRE 2711).

This plant is characterized by its very late flowering season, April–May, by the large clear and yellow flowers with the upper lobes more upright than is usual in the species and by the very large cormlets produced on long stolons. Chromosome counts on plants from gardens in Cape Town have shown that this cultivar is a pentaploid with 75 chromosomes. The plants flower so late in the season that cross-fertilization with any other species or garden hybrids is unlikely. While the diploid species of *Gladiolus* are usually self-sterile, the polyploid species are often capable of self-fertilization. As can be seen from the plate, a quantity of presumably self-pollinated seed is formed, a proportion

of which is viable and in some recent experiments has been found to germinate readily if sown about midsummer.

COLOUR PLATE 6. STELLA CRAIG. *Flower. Pl. S. Afr.* t.16 (1923).—1, plant much reduced; 2, longitudinal section of flower; 3, bract; 4, bracteole; 5, anther with part of filament; 6, stigmas with part of style; 7, young fruit; 8, seed. Ex hort. Benoni Park (PRE 2711). April 1922.

What is possibly the first reference to this plant is to be found in Wood & Evans, *Natal Plants* sub t.99 (1899). In 1894 Wood had received corms of the late flowering stoloniferous plants from Delagoa Bay, *Wood* 5634 ex hort. Durban (BM, K). These he said 'increase rapidly and in a few years form a dense mass of stems which flower profusely from April to June. It is the only *Gladiolus* that does well in the Durban Botanic Gardens.' The description and illustration were done from specimens brought back by W. Slatter from Zululand, which flowered in May 1899: and these latter appear to have been identical with the cultivar as grown today. Nearly 25 years later, the first definite record occurs. Plants were sent from the Benoni Municipal Park to Pretoria in 1922 and the following year, according to Phillips, 'a bed of plants growing at the Division of Botany Pretoria made an exceptionally fine display and there can be little doubt that it is the finest native *Gladiolus* to be found in South Africa'. Whether the Benoni Park stock came originally from the Durban Garden, or whether they were a later collection from the wild is uncertain; and therefore the specimen sent to Pretoria and used for the illustration in *Flowering Plants of South Africa* is selected as the type of this cultivar.

Some four years later Miss Stanford acquired corms for her nursery garden at Banhoek near Stellenbosch. In her book *A Garden of South African Flowers* she stated that she had received them from a friend in the Transvaal who had rescued them from ground that was being ploughed up for a new golfcourse: but there is no evidence to believe that they were indigenous. The plants did extremely well in the damper part of her garden and increased rapidly. She found a ready market for the cut-flowers from late April to June, and for the corms. In May 1935 she wrote that she was cutting and selling 80–100 dozen spikes a week and in April 1937 she reported that she had approximately 15 000 coming into flower and wondered whether the Cape Town market would take them all. (Letters to T. T. Barnard.) The cultivar indeed by its adaptability, vigour and rate of increase eventually saturated the market both for cut-flowers and corms and a spectacular and desirable garden plant became in the space of a few years a common garden 'weed'. Overseas, its success was limited by climatic conditions. In England it grew and increased, surviving the winter in the open ground, but even in Devon and Cornwall it never flowered—the developing flower spikes starting to come up in November and being invariably so chilled or frosted that they failed to develop. In warmer climates, it was at first a popular success and it is still grown in quantities in many gardens in Australia, New Zealand, southern Europe and California.

In South Africa it can be seen everywhere, for it is extremely persistent even in poor and uncongenial situations. But as Sima Eliovson stresses in her book *S. African Flowers for the Garden*, it needs occasional division and good soil and summer watering, if it is to give of its best. The stunted and impoverished plants that may be seen in rockeries or neglected corners hardly do justice to 'the finest native *Gladiolus* to be found in South Africa'.

Miss Stanford from the first advertised it under the name of '*G. psittacinus* var *Hookeri*'. There is no authority for this varietal name. It is believed to have originated when Miss Stanford sent specimens to Kirstenbosch for identification. The cultivar was identified as *G. psittacinus* Hooker. Considering that it was quite distinct from the typical *G. psittacinus* (*natalensis*), which she was also growing, she listed it as 'var *Hookeri*' and she continued with this name throughout her life. In South Africa in recent years the cultivar has come to be regarded as the typical *G. psittacinus* (or *G. natalensis*) and most gardeners and some nurserymen seem unaware that there are any other forms of the species than this late autumn-flowering form. Elsewhere the name 'var *Hookeri*' has persisted, often shortened to *Gladiolus hookeri* under which name there have been references to it in recent American *Gladiolus* publications.

The plant must be regarded as a single clone, derived from a single collection from one of the similar late-flowering stoloniferous populations in northern Zululand or Moçambique. It has been known as '*Gladiolus* var. *Hookeri*' for nearly 50 years. There may be objections to the perpetuation of this name, for the name was originally given in error and the plant has no connection with either of the Hookers. Nevertheless it seems unnecessary to propose a new cultivar name at this stage. *Gladiolus natalensis* cv '*Hookeri*' maintains the historical connection with the early records of the plant that Miss Stanford did so much to popularize and distribute.

12. ***Gladiolus papilio*** Hook f. in Curtis's bot. Mag. t.5565 (1866); Bak, in J. Linn Soc. **16** : 175 (1877), Handb. Irid. 216 (1892), Fl. Cap. **6** : 152 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 222 (1893); Wood, Natal Pl. **6**, t.528 (1910); Pole Evans in Flower. Pl. S. Afr. **10**, t.362 (1930); Trauseld, Wild Flowers of the Natal Drakensberg 47 (1969). Type: South Africa, without precise locality, *Cooper* (K, holo., PRE, photo.). Apparently the flowering plant used for the illustration was raised at Kew from corms collected by Cooper. The open flowers are absent from the specimen.

G. purpureo-auratus Hook. f. in Curtis's bot. Mag. t.5944 (1872); Fl. des Serres ser. 2, **9**, t.1992 (1873). Bak. in J. Linn. Soc. **16** : 175 (1877), Handb. Irid. 216 (1892), Fl. Cap. **6** : 152 (1896); Dur. & Schinz, l.c. 223. Type: Natal, Bergville, Upper Tugela River, *Allison* (K, holo.). *G. spathulatus* Bak., Handb. Irid. 223, Fl. Cap. **6** : 160; Dur. & Schinz, l.c. 224. Type: Transvaal, Waterberg district, De Beer near Nylstroom River, *Nelson* 295 (K, holo.). *G. brachyscyphus* Bak., Handb. Irid. 210, Fl. Cap. **6** : 149; Dur. & Schinz, l.c.

214. Type: Cape, Mount Currie district, near Kokstad, *Tyson* 1427 (K, holo., BOL, GRA). *G. schlechteri* Bak. in Bull. Herb. Boiss. ser. 2, 4 : 1006 (1904). Type: Transvaal, Donkerhoek, 10 km E. of Pretoria, *Schlechter* 4132 (Z, holo., BOL).

Corm subglobose, 1–3 cm diam., usually giving rise to a few short stolons with a terminal cormel; tunics soft, submembranous, dark or reddish brown. *Stem* simple, fairly slender to moderately stout, 50–90 cm high, usually curved just below the spike and upper part subdeclinate, with 1–3 basal sheaths, the outer brown, 2–6 cm long, inner up to 15 cm, green above the base. *Leaves* 7–8, the 4–5 basal distichous, ensiform or lanceolate, reaching to about middle of stem, 0,5–2 cm or occasionally to 2,5 cm wide, fairly firm, with the midrib and margins slightly prominent and a few inconspicuous secondary veins. *Spike* subdistichous or secund, lax or fairly lax, usually 5–10-flowered, occasionally only 3–5. *Bract* subnavicular, oblong or ovate-oblong, acute or subobtuse, 3–2 cm long, the lowest occasionally acuminate and up to 4,5 cm, usually dull purplish green; bracteole slightly shorter than bract, shortly bidentate. *Flowers* fairly small, more or less cernuous, campanulate or funnel-shaped, the lobes not reflexing, often incurved at apex, varying from bright or dull yellow, sometimes more or less tinged with mauve or dull purple outside, to dull purple, with a dark red or purple central band extending from the throat upwards on lower lobes, broad and cuneate edged with yellow or yellow-green above on laterals and narrower on the lowest. *Perianth tube* 1,5–2,3 cm long, strongly curved near middle, cylindrical below and funnel-shaped above; *lobes* obtuse or subobtuse, rarely subacute; 3 upper broadly obovate or obovate-spathulate, the dorsal largest, 2,5–3,3 cm long, 1,5–2,5 cm wide, laterals up to 2,5 cm long, 1,3–2 cm wide; 3 lower similar to upper but narrower and more spathulate or the laterals somewhat cuneate and lowest more or less oblong-spathulate, up to 2,8 cm long, 1–1,6 cm wide. *Stamens* arcuate, arising near middle of tube; filaments 1,8–2,2 cm long; anthers linear, subsagittate, 0,8–1,1 cm long. *Ovary* oblong or subtrilobate, 5–8 mm long; style reaching from base of anthers to shortly below top, with narrow spathulate or obcordate-spathulate subconduplicate branches 4–5,5 mm long. *Capsule* oblong or ellipsoid, pale, coriaceous, with numerous oblique transverse ridges, about 2,5 cm long; *seeds* yellow-brown, broadly winged, suborbicular or oblong-orbicular, 7–9 mm long.

Common in the eastern parts of Southern Africa from the Transkei to northern Transvaal, inhabiting marshy areas or damp grassy places at altitudes ranging from near sea-level to 2 100 m, flowering from December to March. Often gregarious since stolons are freely produced.

COLOUR PLATE 7. FAY ANDERSON.—Top of flower spike and leaf. Corm with immature stolons with terminal cormlets.

Natal.—National Park: Cathedral Peak in marsh; ex hort. December 1970.

This represents a yellow-flowered more upright form, from plants flowered in Prof. Schelpe's garden, Newlands.

CAPE.—Butterworth: 6 km from Butterworth, *Germishuizen* 78 (PRE). Xalangu: Cala, *Pegler* 1616 (BM, BOL, K). Mount Currie: near Kokstad, *Tyson* 1427 (BOL, GRA, K—type of *G. brachysyphus*); Mt. Currie, *Schlechter* 6562 (Z). Umtata: 6 km from Umtata, *Germishuizen* 81 (K, PRE).

NATAL.—Bergville: Upper Tugela River, *Allison* (K—type of *G. purpureo-auratus*); bank of Tugela River, *Galpin* 10158 (K, PRE, Z). Dundee: Dundee, *Sidey* 3499 (K, PRE, S). Durban: Amanzimtoti, *Olivier* (NBG); near Durban, *Sanderson* 367 (K), *Wood* (P); Clairmont, *Wood* 347 (SAM), 1729 (K), 12335 (Z); Clairwood, *Wood* 12754 (PRE). Estcourt: Estcourt, *Germishuizen* 6 (K, PRE), *West* 447, 476 (PRE); Little Tugela valley, near Loskop, *Acocks* 10106 (PRE); Winterton-Cathedral Peak road, *Germishuizen* 8 (K, PRE); Mooi River, *Wood* 770 (BM), 3441 (K), *Mogg* 7046 (CGE, PRE); Hlatikulu, Giant's Castle area, *Edwards* 2423 (PRE); Giant's Castle Reserve, *Trauseld* 461 (PRE). Helpmekaar: 24 km N.W. of Helpmekaar, *Codd* 6783 (K, PRE). Hlabisa: St. Lucia Estuary, *Taylor* 2177 (PRE); St. Lucia Forest Station, *Codd* 10259 (PRE); Hluhluwe Game Reserve, *Ward* 3037 (PRE). Inanda: Inanda, *Wood* 442 (K). Ixopo: Ixopo, *Clarke* 46 (BM); Mtwalume, *Lansdell* (PRE). Lions River: Dargle road, *Mogg* 343 A, 6316 (PRE); The Dargle, *Hilliard* 2161 (NBG); 'Dargavel', *Schelpé* 6319 (BOL); Lions River, *Reynolds* 3726 (NBG). Pietermaritzburg: Pietermaritzburg, *Reynolds* 3726 (PRE). Port Shepstone: Port Shepstone, St. Michael's on Sea, *Strey* 4525 (K, PRE). Richmond: near Richmond, *Schlechter* 6729 (Z). Umzinto: between Umzikulu and Umkomas (Omsamculo and Omcomas), *Drège* 4532 c (S). Underberg: Drakensberg, near Himeville, *Obermeyer* sub TRV 35933 (PRE). Volksrust: Volksrust, *Jenkins* sub TRV 9290 (L, PRE). Vryheid: Vryheid, *Burt* Day 11523 (PRE). Weenen: Culvers, *Rogers* 28167 (Z). Without precise locality: *Sutherland* (K); *Leichtlin* (K); *Gerrard* 647 (K); *Saunders* (BOL) hort. *Ware* (K); *Moss* 19524 (K).

LESOTHO.—Leribe: *Dieterlen* 455 (K, P, PRE, SAM, Z); Thaba Tsueu, *Page* (BOL 27900); Blue Mountain Pass, *Bayliss* 2614 (NBG); Memaing Stream, *Jacot Guillarmod* 2222 (PRE); Brands Village, *Coetsee* 483 (PRE). No precise locality: *Staples* 306 (PRE).

ORANGE FREE STATE.—Bethlehem: Golden Gate, *Roberts* 3319 (PRE), *Spies* AS24 (PRE); near Bethlehem, *Wagener* sub Marloth 13798 (PRE), *Roberts* 3029 (PRE); Rensburgskop, *Jacobsz* 507 (PRE), s.n. (NBG); Swinburne, *Jacobsz* (NBG). Ficksburg: Ficksburg, *McNeil* (NBG), *Foukes* 70 (NBG). Harrismith: 24 km S. of Harrismith, *Codd & Dyer* 6236 (B, K, PRE); Harrismith, *Sankey* 284, 285 (BOL, K); Elands River valley at foot of Mont-aux-Sources, *Flanagan* (BOL 27902); Van Reenen's Pass, *Letty* 474 (PRE); Bestersvlei, near Witsieshoek, *Bolus* 8252 (BOL, K), *Flanagan* (PRE, SAM); Witsieshoek, *Junod* (G, PRE). Marquard: Marquard, *Jacobsz* (PRE). Vrede: Between Warden and Cornelia, *Taat* (PRE). Without precise locality: *Cooper* 995, 3188 (K, Z).

TRANSVAAL.—Barberton: Lomati valley, near Barberton, *Galpin* 1193 (GRA, K, PRE, SAM). Belfast: 19 km N. of Belfast, *Prosser* 1770 (K, PRE); near Belfast, *Hutchinson* 2755 (BOL, K, NBG, PRE), *Pole Evans* PRE 11565 (K), *Burt* Day 1332 (K, PRE), *L. E. Taylor* 1940 (PRE). Bronkhorstspuit: Donkerhoek, c. 24 km E. of Pretoria, *Schlechter* 4132 (BOL, Z—type of *G. schlechteri*). Carolina: Lecuppoort, *Burt* Day (PRE 7341); Carolina, *Fischer*, NBG 854/18 (BOL). Ermelo: *Leendertz*, TRV 7817 (PRE), *Burt* Day 942 (PRE), 17384 (BOL); Nootgedagt Farm, *Henrici* 1392 (PRE). Germiston: Modderfontein, *Conrath* 576 (Z). Johannesburg: Johannesburg, *Hutton* 274 (PRE, GRA). Letaba: Letaba, Duiwelskloof, *Scheepers* 870 (K, PRE). Lydenburg: Goedchoop, *Van der Merwe* 1320 (K, PRE). Middelburg: Middelburg, *Gilfillan* 337 (K). Pietersburg: Woodbush, *Mogg* 14733 (PRE), *Wager* sub TRV 23004 (PRE). Pilgrim's Rest: 10 km N. of Graskop, *Codd* 6737 (K, PRE); Mariepskop, *Van der Schijff* 4508, 6032 (PRE). Pretoria: Rietvlei Reserve, *Repton* 3253, 3446 (PRE); Willowglen, *Forssman* 4 (B, PRE). Roodepoort: Florida, *Moss* 8043, 18110 (K), *Hutton* 601 (BOL, SAM, Z). Springs: Dersley, *Flugge-de-Smidt*, sub. *Moss* 18161 (BM, K). Wakkerstroom: Oshoek, *Devenish* 373 (PRE); Wakkerstroom, *Beeton* 192 (SAM), *Van Dam* TRV 24346 (PRE). Waterberg: De Beer, near Nylstroom River, *Nelson* 295 (K—type of *G. spathulatus*); Mosdene, Naboomspruit, *Galpin* M. 332 (PRE). Witbank: Witbank, *Gilfillan* sub *Galpin* 7255 (BM, GRA, PRE), *Kässner* 240 (BR).

SWAZILAND.—Mbabane: Mbabane, *Burt* Day 2840 (PRE); Dalriach, near Mbabane, *Bolus* 12350 (BOL, K). Pigg's Peak: 6 km from Pigg's Peak, *Johns* 1 (PRE).

WITHOUT LOCALITY: *Sanderson* (K); *Drège* 4534 a (G).

The mauve or purplish colour form of this species was described by Hooker filius and illustrated in *Curtis's Botanical Magazine* in 1866 from corms received at Kew in 1864. He mentions two collections, a Cooper collection and an Arnot gathering from Colesberg. On the sheet bearing Cooper's specimen the word 'type' is written and it appears to have been the plant used for the plate although open flowers are missing. Cooper was engaged as a collector for the nurseryman W. Wilson Saunders of Reigate, who presented the Royal Gardens with some 'roots' of this *Gladiolus*. Since Cooper collected extensively on the Drakensberg mountain slopes bordering the eastern Orange Free State, where

this species is still common, it is likely that it came from this region. The Colesberg area, as far as we know, does not harbour *G. papilio* and it seems likely that Arnot's specimens must have come from further north.

In the same work six years later, Hooker f. figured a bright yellow-flowered form from Natal which he named *G. purpureo-auratus*. Although Baker upheld these as separate species in the *Flora Capensis* he suggested that *G. purpureo-auratus* was perhaps only a colour variety of *G. papilio*. From the vast amount of material collected since then it is now known that the two very striking colour forms are connected by intermediates, the flowers varying from bright yellow or dull yellow more or less tinged with mauve, to mauve or purple with only a small patch of yellow or greenish yellow at the tips of the lower lobes above the conspicuous dark purple or reddish central bands which are present in all the forms and sometimes also in the throat.

It is a fairly common and widespread species extending from the north-eastern Cape to Lesotho, Orange Free State, Natal, Transvaal and Swaziland, with a certain amount of variation, not only in the flower colour but also in the size of the plants and flowers and width of the leaves. Herbarium specimens from three widely separated localities were described by Baker as *G. spathulatus*, *G. brachyscyphus* and *G. schlechteri*, but the types have been examined and found to be conspecific with *G. papilio* so these names, as well as *G. purpureo-auratus*, all fall away into the synonymy. Wood described the ovary as 'pubescent' but this was not found to be so in the specimens examined.

Even with the flower colour lost in drying the species can be identified by the shape and set of its flowers, which are usually somewhat cernuous owing to the tube being strongly curved, and either bell-shaped or funnel-shaped with the lobes nearly always rounded at the apex and not reflexed. Owing to the rather drooping nature of its flowers it is not very popular in cultivation, but the various colour forms have been used for hybridizing and have contributed to the production of the small-flowered Butterfly hybrids.

13. **Gladiolus hollandii** L. Bol. in J. Bot., Lond. **69** : 261 (1931). Type: Transvaal, Tomango near Nelspruit, *Holland* NBG 493/27 (BOL, holo.). *G. varius* Bol. f. var. *elatus* Bol. f. in Ann. Bolus Herb. **2** : 104 (1917); Verdoorn in Flower. Pl. S. Afr. **20**, t.791 (1940). Type var.: Transvaal, Barberton, lower slopes of Saddleback Mountain, *Galpin* 860 (BOL, holo., PRE).

Plants up to 1.20 m high, usually forming small clumps. *Corm* subglobose, about 3 cm in diam., covered with coarse brown fibres. *Leaves* about 8–13, the basal distichous, arranged in a fan, lanceolate to ensiform, 30–85 cm long, up to 2 cm broad, firm with slightly prominent margins, an acentral midrib and a few secondary ribs with numerous fine approximated parallel veins which are minutely and densely puberulous, pale green, apex acute; upper cauline leaves reduced, sheathing the scape. *Spike* overtopping the leaves, secund, many-(up to 40-)flowered, dense or sometimes more lax; occasionally with a basal

branch. *Bracts* narrow, erect, lanceolate to oblong, acuminate to setaceous, 2–3 cm long, soon turning brown. *Flowers* about 5 cm long, with the perianth fairly erect or somewhat curved, funnel-shaped, the tube dark red and lobes white with pink or red speckles and lines. *Perianth tube* slender, up to 2,5 cm long, straight or slightly curved, gradually expanded to the funnel-shaped limb, the lobes fairly equal, about 2,5 cm long, apiculate, the lower somewhat smaller. *Capsule* rounded to oblong, 1–2 cm long, dark brown; *seeds* oblong, 7–8 mm long, dark reddish brown, broadly winged.

Fairly common locally in the eastern Transvaal, where it has been recorded from around Nelspruit and Barberton with two collections from Swaziland and one from Mozambique. It is found on stony grassy slopes at an altitude of about 800 m, flowering from February to April.

COLOUR PLATE 8. CYTHNA LETTY. *Flower. Pl. Afr.* t.791 (1940).—Corm; Inflorescence; portion of basal leaves.

Transvaal.—Nelspruit, on road to Barberton, *Reynolds* 2284 (PRE). ex hort. Pretoria. April 1938.

TRANSVAAL.—Barberton: Lower slopes of Saddleback Mt., *Galpin* 860 (PRE, BOL—type of *G. varius* var. *elatus*); Barberton, *Rogers* 21246 (PRE), *Bayliss* 2718 (NBG, PRE); between Barberton and Nelspruit, *Codd & Muller* 319 (PRE); White River, *Rogers* 20137 (GRA, PRE), 6 km N. of White River, *Obermeyer* sub TRV 36092 (PRE); Plaston, Redhouse, *Graham* 30 (PRE); Abbots Hill, Barberton, *Galpin* 865 (PRE); Noordkaap, c. 16 km N. of Barberton, *Reynolds* 2280 (BOL, PRE). Nelspruit: Nelspruit, *Rogers* 23973 (BOL), *Van der Merwe* 1310 (PRE); 5–13 km S. of Nelspruit, *Leach* 10785 (PRE), *Bayliss & Leach* 717 (NBG), *Reynolds* 2284 (BOL, PRE); Tomango, Holland, NBG 493/27 (BOL); Kaapse Hoop, *Rogers* 21000 (GRA, S), 20777 (PRE). Pilgrim's Rest: Jubilee Hill, *Reynolds* 2292 (PRE).

SWAZILAND.—Hlatikulu: Hlatikulu, *Stewart* 133 (SAM), s.n. (PRE). Stegi: Blue Jay Ranch, *Compton* 29948 (K, NBG, PRE), 31451 (NBG), 31970 (K, NBG, PRE).

MOZAMBIQUE.—6–9 km from Goba on the way to Fonte-dos-Libombos, Lebombo Range, *Estêves de Souza* 122 (PRE).

This species was originally named *G. varius* var. *elatus* in 1917 and was figured under that name by Verdoorn in *Flowering Plants of South Africa* in 1940. The description by Bolus f. of *G. varius* and two varieties was based on herbarium specimens, only a single collection of each being cited; since then a great deal more material has been collected and it is now clear that two species were involved and that the one named var. *elatus* is the same as *G. hollandii* and should be known by that name. *G. hollandii* was described by Louisa Bolus from plants grown in the National Botanic Gardens, Kirstenbosch, found near Nelspruit by Mr F. H. Holland in 1927. In 1963 plants collected in the same area the previous year by Col. R. Bayliss flowered at Kirstenbosch and not only proved to be the same as the one from near Nelspruit figured in *Flowering Plants of South Africa*, but also matched the type and agreed with the description of *G. hollandii*.

Bolus f. distinguished var. *elatus* from *G. varius* by its taller stem, more numerous, longer and slightly wider leaves, shorter bracts and perianth tube, and remarked that in general aspect it resembled *G. crassifolius* Bak. but was

considerably taller and had a differently shaped perianth. It is certainly nearer *G. crassifolius* than *G. varius*, and in addition to the characters which distinguish it from the latter mentioned by Bolus, the smaller bracts of *G. hollandii* are not striate and have narrow hyaline margins, and the colouring and set of its comparatively short-tubed flowers are quite unlike those of the long slender-tubed flower of *G. varius*.

The type of *G. varius* var. *elatus* in the Bolus Herbarium has two branches but this is unusual as the plant is normally unbranched. The colouring of the flowers is uncommon and if they were a little larger this would make an attractive garden plant. Usually the leaves—sometimes also the stem and bracts—are very minutely puberulous, which gives a silvery grey sheen to the leaves in certain lights.

14. **Gladiolus exiguus** Lewis, sp. nov., *G. crassifolius* affinis sed foliis brevioribus venis multis approximatis, perianthio infundibuliformi, lobis anticis lateralibus immaculatis differt.

Planta 30–40 cm alta. *Cormus* c. 3 cm diam. grosse fibrosus in collum breve attenuatus. *Folia* brevia lanceolata c. 17 cm longa 1 cm lata venis multis approximatis, margine flavo incrassato. *Spica* valdē exserta secunda ad 14-flora. *Bracteae* lanceolato—acuminatae 1,5–2,5 cm longae. *Perianthium* infundibuliforme ad 3,5 cm longum roseum; tubo recurvato; lobi obtusi minute mucronulati plus minusve aequales. *Antherae* subsagittatae. *Capsula* oblongo-ellipsoidea 1,5 cm longa; semina oblonga 5 mm longa ala lateraliter angusta.

Type: Transvaal, Lydenburg district, 19 km E. of Lydenburg on road to Sabie, Long Tom Pass, Codd 5173 (PRE, holo., BM, K). (See fig. 6.)

Plants up to 60 cm tall, usually shorter, solitary or gregarious. *Corm* 2–3 cm in diam., thickly covered with coarse brown fibres extending up in a short neck. *Leaves* 7–8, short, 15–25 cm long, 1 cm broad, stiff, closely veined, the margin and midrib yellow, somewhat prominent; upper leaves reduced, sheathing the scape. *Spike* much exserted, secund, 5–18-flowered, the flowers imbricate. *Bracts* lanceolate-acuminate, about 2,5 cm long, firm in texture, smooth, especially towards the apex, with a hyaline margin, soon turning brown, erect in flower, patent in fruit. *Flower* small, 3–3,5 cm long, narrowly bell-shaped, pink, flushed with darker pink outside; when dry minutely and densely speckled with longish brown spots. *Perianth tube* narrow below, curved; *lobes* lanceolate, 2–3 cm long, apex obtuse, the upper subequal, the dorsal placed inside upper laterals, the lower lobes somewhat narrower with the central slightly longer. *Stamens* reaching halfway the dorsal lobe, anthers 5 mm, subsagittate. *Capsule* oblongo-ellipsoid, 1,5 cm long, smooth, brown; *seeds* oblong, 5 mm long, the wing narrowed laterally.

Endemic to the eastern Transvaal where it has been recorded from montane grasslands, occasional or locally frequent, often gregarious, at altitudes from 1 600 to 2 300 m, flowering from January to March.



FIG. 6. Type of *G. exiguus* Lewis.

Photo: National Herbarium, Pretoria.

TRANSVAAL.—Belfast: 14 km W. of Slaaihoek Post Office, *Bruce* 491 (PRE). Lydenburg: near Paardeplaats, *Wilms* 1442 (AMD, G, K, Z). Mount Anderson, Long Tom Pass, 19 km E. of Lydenburg on road to Sabie, *Codd* 5173 (PRE, holo., BM, K); 24 km W. of Sabie near Mount Anderson, *Codd* 6436b (PRE), Mount Anderson, *Galpin* 13777 (K, PRE), s.n. (BOL), *Reynolds* 2310, 5327 (PRE), *Strey* 3532 (PRE); between Sabie and Lydenburg, *Werdermann & Oberdieck* 2129 (PRE, B); Long Tom Pass, *Brent* 110 (PRE), *Werdermann & Oberdieck* 2076 (PRE); 19 km S.E. of Sabie on road to Kemps Heights, *Marais* 44 (PRE). Pilgrim's Rest: Ceylon Ridge on mountain above Sabie, *Brent* 102 (PRE).

G. exiguus is perhaps closest to *G. crassifolius* but usually about half its size. The leaves are much shorter, narrowly lanceolate, with only the margin and the acental yellow midrib prominent, the thinner secondary veins being placed close together. The spike is shorter and fewer flowered and no basal side-branches were seen. From *G. varius* var. *micranthus* it can be distinguished by the bracts for these are smooth, not ribbed, and the margin is hyaline. The perianth when dry is minutely and densely spotted whereas in *G. varius* var. *micranthus* the dry perianth is immaculate and often colourless. The corm of *G. exiguus* is rather large for the size of the plant and is densely covered with coarse light brown fibres. The main flowering time is from February to March, somewhat earlier than that of *G. varius* var. *micranthus*. It was seen to inhabit stony exposed shale slopes where it formed small colonies, or dotted in the grassveld, and common in places on Mount Anderson.

15. **Gladiolus crassifolius** Bak. in J. Bot., Lond. **14** : 334 (1876), J. Linn. Soc. **16** : 175 (1877), Handb. Irid. 215 (1892), Fl. Cap. **6** : 150 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 215 (1893); L. Bolus in J. bot. Soc. S. Afr. **14** : 10, t.2 f.1 (1928), S. Afr. Gdng Ctry Life **19** : 153, f.1 (1929), Second Book S. Afr. Flrs 144, 145 (1936); Weimarck in Bot. Notiser **1937** : 179 (1937); De Smidt, Flrs by the Roadside 32, photo. (1947). Trausel, Wild Flowers of the Natal Drakensberg 45 (1969). Type: Orange Free State, without precise locality, in the eastern districts, *Cooper* 3185 (K, lecto., G, PRE, Z).

G. rachidiflorus Klatt in Abh Naturf. Ges. Halle **12** : 339 et *Ergänz.* 5 (1882); Bak., Handb. Irid. 205, Fl. Cap. **6** : 143; Dur. & Schinz, l.c. 223. Type: Natal, Port Natal, around the bay, *Drège* 4537 (B†, P). *G. paludosus* Bak. in J. Bot., Lond. **29** : 70 (1891), Handb. Irid. 209, Fl. Cap. **6** : 148; Dur. & Schinz, l.c. 222. Type: Transvaal, Ermelo district, Lake Chrissie, *Elliot* 1588 (K, holo.). *G. tritoniaeformis* O. Ktze., Rev. Gen. 3, **2** : 308 (1898). Type: Natal, Estcourt district, Highlands Station, *Kuntze* (NY, holo., K, Z; PRE, photo.). *G. junodii* Bak. in Bull. Herb. Boiss. ser. 2, **1** : 866 (1901). Type: Natal, Lions River district, Howick, *Junod* 320 (Z, holo.). *G. conrathii* Bak. in Bull. Herb. Boiss. ser. 2, **4** : 1005 (1904). Type: Transvaal, Germiston district, Modderfontein, *Conrath* 582 (Z, holo., GZU, PRE, photo.). *G. dieterlenii* Phill. in Ann. S. Afr. Mus. **16** : 282 (1917). Weimarck in Bot. Notiser **1937**; 179 (1937). Type: Lesotho, Leribe, *Dieterlen* 445 (SAM, holo., GRA, K, P, PRE).

Plants up to 1 m high, solitary. *Corm* globose, 2–5 cm in diam. covered with pale brown soft or coarse, often matted fibres, occasionally with sessile cormlets.

Leaves 5–11, forming a short or an elongated, long sheathing fan, linear to broadly linear, up to 70 cm long and 2 cm broad, apex attenuate, sclerotic, with prominent yellow margins and ribs. *Spike* just overtopping leaves, occasionally with a short basal branch, long and many- (up to 40-) flowered; flowers secund during anthesis, buds and capsules distichously arranged; scape geniculate near the apex; rachis lengthening during anthesis, the imbricate flowers becoming more widely spaced below; bracts lanceolate to oblong, 3.5–1 cm long, tip cuspidate to setaceous, green at first but soon turning brown and dry, gaping in fruit. *Perianth* narrowly campanulate, curved, porrect, 2.5–4 cm long, in various shades of pink, red, orange, mauve, purple or white with the lower side-lobes bearing a dark blotch below the apex; tube narrow, curved, 8–15 mm long, upper lobes slightly hooded, rounded to oblong to obovate, up to 3 cm long and 1.2 cm broad; lower lobes about half the size of the upper with the somewhat shorter tongue-shaped dark blotched laterals situated above the central lobe. *Stamens* with yellow or purple, subsagittate, apiculate anthers. *Capsule* small, subglobose, c. 8 mm long, verrucose, reddish brown; *seeds* with a narrow wing, oblong, 3 mm, dark reddish brown.

Widely distributed from the northern districts in the eastern Cape, throughout Natal, Lesotho and the eastern Orange Free State to the Transvaal, recorded as far west as Krugersdorp, and it may occur in Rhodesia and Moçambique, growing scattered on grassy plains and slopes. The altitude varies from near sea-level to about 2 500 m. The normal flowering time is in the autumn, February to April, but it occasionally flowers out of season.

CAPE.—Maclear: near Little Pot River, *Galpin* 6860 (K, PRE); Pamona, Ugie, *Gill* 156 (BOL). Matatiele: hillside above Matatiele, *Galpin* 14053 (K, PRE), s.n. (BOL); Mvenyane, about 19 km S.E. of Matatiele, *Van der Riet* (NBG), *Bandert* 157 (GRA). Mount Currie: near Kokstad, *Tyson* 1350 (GRA, K, PRE, SAM), *Kelly* 16 (NBG). Port St. Johns: Fakus Territory, Pondoland, *Sutherland* (K). NATAL.—Bergville: Cathkin Peak, Drakensberg, *Howlett* 40 (K, PRE, UPS), *Galpin* 11696 (K, PRE); Cathedral Peak, *Killick* 1445 (BOL, PRE, K); Mont-aux-Sources, *Bayer* & *McLean* 167 (K, PRE); Tugela valley, Mont-aux-Sources, *Humbert* 14879 (P), *McLean* & *Bayer* 234 (PRE). Camperdown: *Wood* 3175 (BM, BOL, GRA, K), Durban: Port Natal, around the bay, *Drège* 4537 (B—type of *G. rachidiflorus*, P), Eshowe: Ntumeni (Entumeni), *Wood* 3957 (BM, K, SAM). Estcourt: Mooi River, *Mogg* 6973 (CGE, PRE); Highlands Station, *Kuntze* (K, Z, NY—type of *G. tritoniaeformis*); near Highlands, *Schlechter* 6848 (BOL, GRA, Z); Estcourt—Colenso, *Penther* 375 (BOL), *Krook* in herb. *Penther* 653 (Z); Giant's Castle, *Symons* 427 (BOL, PRE); Beacon Hill, near Estcourt, *Acocks* 10110 (PRE), Hlabisa: Charters Creek, *Ward* 2764 (K, PRE); St. Lucia Bay, *Martin* 926 (NBG); Mplate Plantation, Hlabisa, *Taylor* 2457 (NBG, PRE); Meersig Plantation, Hlabisa, *Taylor* 2473 (NBG); Hluhluwe Game Reserve, *Ward* 2236 (PRE); Makakatana Forest Station, W. of Lake St. Lucia, *Codd* 10262 (PRE). Ingwavuma: near Lake Amanzimnyama, Kosi Bay, *Edwards* 2623 (K, PRE) Klip River: Colenso—Van Reenen's Pass, *Krook* in herb. *Penther* 575 (S, Z); Van Reenen's Pass, *Bayliss* 2717 (NBG), *Thode* 3914 (STE). Kranskop: Kranskop, *Sidey* 3196 (S). Lions River: Shafton, Howick, *Hutton* 48 (BM); Howick, *Junod* 320 (Z—type of *G. junodi*); Nottingham Road, *McLean* 807 (K); 16 km W. of Drayton, *Dyer* 5319 (PRE). Mtunzini: 24 km from Port Durnford, *Codd* & *Dyer* 2819 (PRE). Newcastle: Newcastle, *Wilms* 2291 (K), 2291 a (BM). Ngotshe: 32 km from Pongola on Pigg's Peak road, *Wells* 2236 (PRE). Nkandla: Nkandla, *Wylie*, herb. *Wood* 8951 (L); Qudeni, *Gerstner* 652 (PRE). Pietermaritzburg: Tweedie, *Mogg* 1349 (CGE, PRE); Impendle, *Wylie*, herb. *Wood* 8233 (P). Polela: Polela, *Wood* 4713 (K). Richmond: Richmond, *Wheeler* (AMD). Ubombo: Mpangazi—Bazwana, *Strey* 5069 (PRE); Sordwana Bay, *Prosser* 1985 (PRE). Umfolozi: near Richard's Bay, *Osley* 22 (PRE). Umvoti: near Sevenoaks, *Marais* 803 (PRE). Umzimto: Dumisa, *Rudatis* 625 (BM, K), 1916 (G, LD); Umgaze Flats, *Rudatis* 878 (Z); Scottburgh, *Wheeler* (LD). Underberg: Underberg, *McLean* 653 (K) (PRE). Weenen: Culvers, *Rogers* 27849, 28461 (Z), *Schlechter* 6943 (Z); between Dalton Bridge and Hlatikulu, *Acocks* 10189 (PRE). Without precise locality: Zululand, *Gerrard* 561, 595 (BM, K); *Sutherland* (K).

LESOTHO.—Leribe: Leribe, *Dieterlen* 445 (GRA, K, P, PRE, SAM—type of *G. dieterlenii*), *Phillips* 833 (SAM); Pitseng valley, *Staples* 304 (K, PRE). Quacha's Nek: *Fawkes* 349 (NBG).

ORANGE FREE STATE.—Bethlehem: Golden Gate, *Compton* 22475 (NBG), *Acocks* 11204 (PRE), *Liebenberg* 6907 (PRE), *Roberts* 3119 (PRE); 24 km E. of Clarens, *Marais* 128 (PRE). Ficksburg: Strathcona, *Fawkes* 135 (NBG). Harrismith: Harrismith, *Sankey* 288 (BOL, K), *Wood* 4825 (K); Witsieshoek, *Junod* (PRE); Bestersvlei, near Witsieshoek, *Bolus* 8253 (BOL); Rensburgskop, Swinburne, *Jacobsz* 505 (PRE), s.n. (NBG). Without precise locality: *Cooper* 3185 (G, K, PRE, Z), 3199 (K, Z).

TRANSVAAL.—Barberton: Montrose, *Brent* 120 (PRE). Belfast: Dullstroom, *Van der Merwe* 1300 (LD, PRE, UPS); Belfast, *Burt Day* 1986 (K), *Galpin* 12201 (PRE), *Srey* 3978 (K, PRE), *Bayliss* 2021 (NBG); hills above Waterval-Onder, *Van der Merwe* 1292 (LD, PRE). Bethal: between Porter and Trichardsfontein, *Rehmann* 6663 (K). Brits: Scheerpoort, Magaliesberg, *Van Vuuren* 487 (K, PRE). Bronkhorstspuit: Rayton, *Rogers* 20458 (K, Z); Premier Mine, *Rogers* 25373 (S). Carolina: Waterval-Boven, *Moss* 17317 (K), *Young* 69 (PRE), *Mason* 114, 115 (K); near Waterval-Boven, *Van der Merwe* (K); Carolina, *Van der Schijff* 2603 (PRE). Ermelo: Lake Chrissie, *Young* 709 (K), *Moss* 16491 (K); Vlakfontein, Lake Chrissie area, *Pole Evans* 1056 (K, PRE), *Rogers* 4791 (PRE); Bankop, 37 km E. of Ermelo, *Burt Day* 1667 (PRE), *Leendertz* sub TRV 7791 (PRE); Ermelo, *Reynolds* 2316 (BOL, PRE); Atholl Pasture Station, *Codd* 383 (PRE). Germiston: Modderfontein, *Conrath* 582 (GZU, Z—type of *G. conrathii*). Groblersdal: 11 km N. of Verena, *Verdoorn* 2438 (PRE). Heidelberg: Dersley, *Flugge-de-Smidt* (PRE). Johannesburg: Northcliff, *Reynolds* 2286 (BOL, K, PRE, UPS); Johannesburg, *Moss* 6060, 13168, 16459, 19523 (K), *Rand* 1192, 1193 (BM); Melville Koppies, *Macrae* 1467 (NBG); near Johannesburg, *Watt & Brandwijk* 2489 (PRE). Lydenburg: Lydenburg, *Wilms* 1426 (AMD, BM, G, K, P, PRE, Z), 1436 (AMD, G, P, Z), *Burt Day* 1286 (PRE); 19 km W. of Lydenburg, *Codd* 6456 (BM, PRE, K); Steenkampsberg, 40 km from Lydenburg, *Reynolds* 2302 (K, PRE); Erasmus Pass, *Srey* 3292 (BM, K, PRE, Z); Strydom Tunnel area, *McNeil* (NBG). Middelburg: near Middelburg, *Wilms* 1436 b (K); 39 km N.E. of Middelburg, *Dyer* 3938 (L, PRE); Botsabelo Mission Station, *Nelson* 143 (K, PRE). Nelspruit: Schagen Hill, near Nelspruit, *Codd* 5453 (BOL, K, PRE); Kaapsechoop, *Cory* (K). Piet Retief: Iswepe, *Sidey* 1568 (PRE, SAM); Hlangapiesberg (Slangapiesberg), *Sidey* 3523 (S). Pilgrim's Rest: Pilgrim's Rest, *Rogers* 14602 (BOL, K); Graskop, 'Old London Farm', *Galpin* 14458 (K, PRE), s.n. (BOL); 'Bourkes Luck', Graskop area, *McNeil* (NBG); Mauchsberg, *Van der Merwe* 837 (PRE); Jubilee Hill, *Reynolds* 2292 (PRE). Pretoria: near Pretoria, *Muller* (K), *Pont* 738 (Z); Apiespoort, Pretoria, *Rehmann* 4031 (K, Z); Hornsnek, Magaliesberg, *Schlieben* 7855 (B, G, K, Z); Boskop, *Schweickerdt* 984 (C); 18 km S.E. of Pretoria, *Codd* 2674 (BM, K, PRE); Kaalfontein, *Pole Evans* s.n. (GRA, K), *PRE* no. K. 12069 (BOL), 14208, 17569 (PRE); Irene, *Pole Evans* PRE 698 (PRE); Pretoria, *Leendertz* sub TRV 4057, TRV 6842 (PRE), *Mogg* 16044 (PRE), *Acocks* 11254 (PRE). Vereeniging: Burtholme, Vereeniging, *Burt Day* sub PRE 17219 (BOL, K). Wakerstroom: Oshoek district, *Devenish* 605 (PRE). Witbank: Schoeman's Kloof, *Repton* 891, 990 (PRE).

SWAZILAND.—Bremersdorp: Manzini, 9 km E. of Bremersdorp, *Reynolds* (K, NBG). Hlatikulu: Hlatikulu, *Stewart* 119, 132 (K, SAM), 76 (K). Mankaiana: Mankaiana, near Gege, *Karsten* (K, NBG, PRE). Mbabane: Ukutula, *Compton* 24961 (NBG, PRE); Forbes Reef road, *Compton* 25644 (NBG, PRE); The Caves, Black Mbuluzi River valley, *Compton* 26790 (NBG, PRE); near Mbabane, *Karsten* (NBG), *Edwards* sub BOL 15181 (STE); Hlambanyati valley, *Compton* 25062 (NBG, PRE).

A common, widespread, usually rather dull, small-flowered species adapted to many different habitats, from the warm low-lying grasslands in northern Natal to the high mountain slopes of the Drakensberg, the variation being mostly the result of differences in habitat and climate. Characteristic of the species is the way in which the stem nearly always curves out from between the stiffly erect leaves at the point where it emerges from them, so that the usually long, closely and many-flowered spike is borne at an angle to the leaves. There is variation in the size and width of the leaves but the yellow raised ribs are always prominent. Similarly the imbricate bracts vary in size and shape, becoming long acuminate in some strains. The size of the perianth and the length of the tube also vary, as well as the colour and its intensity, from pale pink to wine red or pale mauve to dark purple, usually on a white background, the darker colour inherent or often emerging with age. In northern Natal the colour is usually a bright orange, making the plant more conspicuous and attractive. In all cases the shorter tongue-shaped lower side-lobes bear a dark patch in the centre and are situated above the lowest lobe.

Baker cited several collections in the Kew Herbarium when he first described the species but as he did not designate any particular one as the type *Cooper* 3185 has been chosen as the lectotype.

Material from the eastern escarpment in Rhodesia has softer, closely veined leaves and larger flowers. A future reviewer of the genus may very likely enlarge the present concept of the species and its close allies, to include some subtropical forms.

According to Phillips the Sesuto name for the rather small and few-flowered Lesotho form, which he named *G. dieterlenii*, is *Khahla e nyenyane*, meaning the small thing which pleases, and he mentioned that a preparation from this and other plants is used by the inhabitants as an enema, and is also said to be a cure for headache and lumbago.

16. ***Gladiolus densiflorus*** Bak. in Vjschr. Naturf. Ges. Zürich **49** : 178 (1904). Type: Transvaal, Letaba district, Shilouvane, *Junod* 1204 (Z, holo., G, K, LD, PRE).

Plants up to 1,30 m tall, solitary or forming small clumps. *Corm* subglobose, c. 3 cm in diam., with tunics of brown wiry fibres; with sessile cormlets. *Leaves* 9–12, the basal 6–8 forming a spreading fan, broadly linear to ensiform, 25–50 cm long, 1–3,5 cm wide, apex acuminate, soft, glaucous green, with an acentral raised yellow midrib, several secondary ribs and numerous fine, closely spaced veins; the 3–4 upper leaves reduced, bract-like, sheathing scape. *Spike* exserted from the leaf-fan, elongating during anthesis; flowers 15–30, second, imbricate, the buds and capsules distichous; rarely with a short basal side-branch. *Bract* oblong to oblanceolate, 2,5–1,5 cm long, usually flat, apex obtuse to acuminate, soon drying up, brown. *Flowers* small, 3–4 cm long, obliquely funnel-shaped, densely spotted with dark red, maroon, mauve or pink raised dots on a whitish or greyish background; tube yellow-green inside, lower lobes with a yellowish medial line near the tips. *Perianth tube* slightly curved, 8–13 mm long, funnel-shaped; lobes fairly similar, obovate, retuse, c. 1,5 cm long, dorsal largest, somewhat hooded, the others patent above middle, the lower laterals placed above central lobe. *Stamens* with purple subsagittate anthers. *Capsule* globose, 1 cm in diam. woody, reddish brown; seeds oblong, the wings narrowed laterally, c. 6 mm long.

Endemic in the eastern Transvaal from around White River and the Pretoriusskop area in the Kruger National Park to Letaba, in frost-free grassland in the Lowveld and Bushveld at altitudes from 500 to 1 300 m, flowering from February to April.

FIG. 7. From a painting by G. J. Lewis. — 1, Top of inflorescence; 2, corm and leaves, $\times \frac{1}{2}$; 3, flower laid out; 4, flower side view; 5, longitudinal section of flower, $\times 2$; 6, gynaeceum; 7, part of leaf; 8, bract; 9, bracteole.

Transvaal.—Pietersburg, Woodbush, *Taylor* 2457 (BOL), ex hort. Kirstenbosch. March 1936.



FIG. 7. *G. densiflorus*.

TRANSVAAL.—Letaba: Shilouvane, *Junod* 1204 (G, K, LD, PRE, Z); The Downs, *Junod* 4138 (PRE, SAM), *Crundall* s.n. (PRE); Politsi road, *Scheepers* 222 (K, PRE); 'Cyprus', *McNeil* s.n. (NBG). Lydenburg: Spitskop, *Brent* 112 (PRE), *Wilms* 1441 (AMD, BM); near Lydenburg, *Atherstone* (K). Nelspruit: 6 km E. of Montrose Falls, *Codd* 7766 (PRE). Pietersburg: near summit of Wolkberg, S.E. of Haenertsburg, *Meeuse* 9905 (PRE, K), Woodbush, *Van Warmelo* 235 (PRE). Pilgrim's Rest: Belvidere near Graskop, *Brent* 119 (PRE); Blyde Pools near Graskop, *McNeil* (NBG); Bourke's Luck, *Mauve & Leistner* 3259 (PRE); Klaserie, near Acorn Hock, *Rothmann* (NBG 2615/27, BOL); Pilgrim's Rest, lower slopes of town hill, *Galpin* 14407 (PRE) s.n. (BOL). White River: Kruger National Park, 3 km S.E. of Pretoriuskop, *Codd & De Winter* 5121 (PRE); Klakwene, *Van der Schijff* 330 (PRE). Numbi Gate, *Mauve & Collett* 4640 (PRE), *Brent* 38 (PRE).

G. densiflorus is near *G. crassifolius*, as Baker remarked when he described it, but can readily be distinguished by its less rigid leaves with more numerous and uniformly even fine secondary veins and the more regular somewhat funnel-shaped spotted flowers. Often the spotting is so dense that the white or greyish ground colour is almost completely covered and the flowers appear to be dark red or purplish.

Although the description was published over sixty years ago the identity of this species remained obscure until 1965, when Lewis examined the type and isotypes in Kew and other herbaria in Europe and found that the various collections cited above belong to it. In the majority of them the spike is very dense and many-flowered but owing to the small size and rather dull colouring of the flowers this species is not of any horticultural value.

17. *Gladiolus invenustus* Lewis, sp. nov., *G. densifloro* affinis, sed perianthio aliquanto minore, immaculato, pallide violaceo vel albo, spica floribus paucis plus minusve laxe dispositis, habitat in parte regionis austro-orientalis (Swaziland, Natal) et florescentia praecoci (Decembri) differt.

Planta ad 1,50 m alta. *Cormus* globosus c. 3 cm diam. tunicis brunneis fibrosis. *Folia* 8–11, disticha, lineari-lanceolata vel ensiformia, 20–50 cm longa, 1–4 cm lata, flavi costata, costis multis prominentibus approximatis. *Spica* exserta ad 1,50 m alta, floribus ad 25 secundis vel distichis leviter effusis. *Perianthium* album vel pallide violaceum, lobis inferioribus lateralibus maculatis. *Capsula* oblongo-globosa, 1 cm diam.; semina alis lateraliter angustis.

Type: Swaziland, Evelyn Baring Bridge over the Usutu River, *Compton* 30382 (NBG, holo., PRE, iso.).

Plants up to 1,50 m high, forming small clumps. *Corms* one to several together, globose, c. 3 cm diam. covered with coarse brown fibres. *Leaves* 8–11, the 5–6 basal forming a close fan, linear to lanceolate to ensiform, 20–50 cm long, 1–4 cm wide, apex acute to acuminate, often with a lax twist, firm, glaucous green with prominent yellow margins, an acentral midrib, several secondary ribs and numerous fine closely spaced veins; upper 2–3 leaves reduced, sheathing the scape. *Spike* exserted, up to 1,50 m tall, occasionally with a short basal branch; bracts ovate acuminate, c. 2,5 cm long green but soon dry and brown. *Flowers* up to 25 per spike, secundly or distichously arranged, usually somewhat laxly spaced, appearing rather untidy. *Perianth* c. 3 cm long, narrowly campanulate, whitish to pale mauve or pale pink with yellow or mauve blotches



G. J. Lewis

FIG. 8. *G. invenustus*.

near the centre of the lateral lobes; tube narrowly funnel-shaped, curved; upper lobes broadly ovate, lower lanceolate often shortly clawed, laterals shorter, placed above lower central lobe. *Capsule* oblongo-globose, *c.* 9 mm long; *seeds* oblong *c.* 4 mm long, the wings narrowed laterally.

Common in Swaziland and also recorded from northern Natal, on grassy hill slopes or flats probably at altitudes up to 1 000 m, flowering mainly in December, rarely in March–April.

FIG. 8. From a painting by G. J. Lewis.—Inflorescence; corm and base of leaves; flower laid out; bract and bracteole.

Natal.—Hlabisa, St. Lucia Bay, *Lewis* 6177 (NBG), ex hort. Kirstenbosch. September 1964.

SWAZILAND.—Hlatikulu: Sitobela, *Compton* 29718 (NBG, PRE). Manzini: Croydon, *Compton* 31155 (NBG); Balegane road, *Compton* 24645 (NBG). Mbabane: Between Mbabane and Bremersdorp, *Bolus* 12355 (BOL, K, PRE); near Bremersdorp, *Compton* 24786 (NBG, PRE); Mbabane, *Rogers* 11576 (BOL, PRE), *Compton* 28465 (PRE), 32176 (NBG). Usutu Forest, *Compton* 27352 (NBG, PRE); near Little Usutu River, *Compton* 28465 (NBG); Pigg's Peak—Mbabane road, *Ihlenfeldt* 2444 (PRE). Pigg's Peak: Ngonini, *Compton* 30547 (NBG, PRE). Stegi: Palata, *Compton* 31423 (NBG, PRE).

TRANSVAAL.—Barberton: Shilengobo Dam, *McNeil* (NBG). 2531CB

NATAL.—Hlabisa: Charters Creek, St. Lucia Bay, *Lewis* 6177 (NBG); Fanis Plantation, *Taylor* 2447 (NBG). Ingwavuma: Kosi Bay, *Ross & Moll* 1840 (NH, PRE). Ubombo: Sordwana Bay, *Prosser* (K, PRE).

The species is not a very attractive one as the flowers are small and very pale. It is closely allied to *G. densiflorus* vegetatively but the spike has fewer flowers which are somewhat untidily arranged on the rhachis, secund or distichous, with the spaces in between of unequal length; the flowers are smaller, paler and not spotted; moreover the main flowering period is in December and it is found further south and east. However, more field work is needed to investigate the relationship of these two taxa and also the distribution in northern Zululand where it has only rarely been collected.

18. *Gladiolus calcaratus* Lewis, sp. nov. distincta.

Cormus 1.5 cm diam. tunicis fibrosis. *Folia* 5–7 linearia vel lanceolata 15–35 cm longa 4–8 mm lata solida costa prominenti. *Spica* secunda 5–10 flora bracteis lanceolatis *c.* 5 cm longis membranaceis. *Flores* anguste campanulati ad 7 cm longi, albi vel rosei vel lilacini; lobo inferiore mediano longissimo. *Antherae* ad basin longe caudatae.

Type: Transvaal, Lydenburg district, Mount Anderson, near the top of Long Tom Pass, in grassy area beside road, *Leistner & Mauve* 3218 (PRE, holotype, NBG).

Plants up to 60 cm tall. *Corm* *c.* 2 cm in diam. with fibrous tunics. *Leaves* 4–7, the 3–4 basal distichous, linear, up to 30 cm long and 1 cm broad, apex shortly acuminate, margin and midrib raised, yellow, with many thin secondary veins, glabrous, the upper 2–3 leaves reduced, sheathing scape. *Spike* secund, about 5–10-flowered; bracts narrowly lanceolate acuminate, up to 4 cm long, acute, membranous, green, soon turning brown. *Flowers* fairly large about 7 cm long,

narrowly campanulate, white, the central area turning pale pink to pale mauve with age, yellow in the throat with a medial yellow line extending half-way up the lobe surrounded by a flushed pink area. *Perianth tube* hidden inside bracts, curved, about 3 cm long; *limb* somewhat closed with the inner lobes encircled by the outer lobes, the lowest longest, protruding out and downwards. *Stamens* with the yellow anthers caudate, 9–12 mm long with the tails 3–4 mm long. *Capsule* and *seeds* unknown.

Endemic in the eastern Transvaal, occasional on grassy mountain slopes at altitudes of 2 100–2 400 m, flowering from the end of January to March.

TRANVAAL.—Lydenburg: Mount Anderson, *Galpin* 13662 (BOL, NBG, PRE); 24 km west of Sabie near Mount Anderson, *Codd* 6435 (PRE), 6436 (NBG, PRE). Carolina: 28 km south of Machadodorp, *Codd* 8273 (PRE).

The specific name refers to the long-spurred anthers. As far as is known only one other species, viz. the following species, *G. appendiculatus*, also has the lower part of the anther-locules sterile and forming caudate appendages.

In *G. calcaratus* the caudate appendages or tails hang down at right angles from the anthers inside the perianth tube. An insect entering the tube in search of nectar pushes against the tails and this causes the anthers to move downwards depositing pollen on its back. In *G. appendiculatus* the tails were more in line with the anthers and consequently the reaction was not so pronounced.

19. **Gladiolus appendiculatus** Lewis, sp. nov., *G. calcarato*, affinis, sed floribus minoribus bracteis ovatis acutis 2 cm longis differt.

Cormus subglobosus ad 2,5 cm diam. tunicis brunneis fibrosis, stolonifer. *Folia* 3–4 ensiformia lanceolata vel linearia 14–25 cm longa 0,8–2,2 cm lata solida ad basin plerumque hirsuta margine albido. *Spica* secunda ad 50 cm alta 3–12(–20) flora. *Bractee* c. 2 cm longae erectae rhachim amplectentes. *Perianthium* parvum ad 3 cm longum plus minusve campanulatum album roseo vel lilacino suffusum. *Antherae* caudatae caudis 2–3 mm longis.

Type: Transvaal, Wakkerstroom district, farm Oshoek, *Devenish* 852 (PRE, holo.).

Plants 35–50(–80) cm tall. *Corm* globose, small about 2 cm in diam, with coarse light brown fibres forming a short neck and short capillary stolons c. 4 cm long. *Leaves* with the lower 3–4 well developed, ensiform to narrowly lanceolate, 14–33 cm long and 1–2 cm wide, apex acute to obtuse (longer and linear in the var. *longifolius*), attenuated below, softly leathery in texture, margin white, the 3–5 ribs, indistinct, becoming distinct when dry, slightly pubescent at the base; the upper 2–3 leaves, reduced, bract-like, widely spaced and clasping scape. *Spike* much overtopping the leaves, 30–40(–70) cm high; fertile bracts erect, ovate-lanceolate, 2–3 cm long, acute membranous, clasping rhachis, bracteole and perianth tube. *Flowers* 5–11-flowered (in var. *longifolius* up to 20-) secund, imbricate, small, somewhat campanulate, 2–3 cm

long, white with pale rose or mauve markings or pale pink; *perianth tube* thin c. 1.5 cm long, expanding slightly; lobes fairly similar, ovate, about 1.5 cm long, obtuse to shortly acute, the lowest slightly longer. *Stamens* arising near middle of tube, c. 1 cm long, anthers linear, 6–7 mm long, shortly apiculate, caudate with the tails c. 2 mm long. *Capsule* unknown.

Recorded from the eastern Transvaal, northern Natal and Swaziland on mountain slopes at fairly high altitudes c. 2 100 m, rare, flowering February–March.

Two varieties are recognized.

KEY TO VARIETIES

Plants up to 50 cm, leaves ensiform to lanceolate; spike up to 12-flowered	(a) var. <i>appendiculatus</i>
Plants up to 80 cm, leaves linear, glabrous or hispidulous; spike up to 20-flowered	(b) var. <i>longifolius</i>

(a) var. *appendiculatus*

In the typical variety the leaves are ensiform to lanceolate up to 25 cm long and 2 cm broad. There are usually about 5–8 flowers on a spike which is about twice as long as the leaves. The small bell-shaped porrect perianth was described as 'snow-white' by Gerstner or white with pale pink or mauve markings.

TRANSVAAL.—Barberton: mountain slopes near Barberton, *Galpin* 1253 (K); Barberton, *Edwards* 4 (PRE). Wakkerstroom: farm Oshoek, *Devenish* 582 (PRE); 852 (K, PRE); farm Groothoek, Madlangampisiberg, *Killick* 3931 (PRE).

NATAL.—Vryheid: Dumuku Mountain near Vryheid, *Gerstner* 4583 (PRE). Without locality: *Rogers* 18682 (BOL); *Thode* 3933 (STE).

(b) var. *longifolius* Lewis, var. nov. *Planta major*; *folia longiora et angustiora*; *spica longior conferta ad 20-flora*; *flores pallida rosei*.

Type: Swaziland, Hlatikulu, *Stewart* (BOL 10070, *holo.*).

This more robust variety bearing long linear leaves has so far been recorded only from Swaziland at an altitude of 1 000–1 500 m, flowering in April–May.

SWAZILAND.—Hlatikulu: Hlatikulu, *Stewart* (BOL 10070). Mbabane: Mukusini Hill, *Karsten* (NBG 61469); Forbes Reef, *Compton* 30019 (NBG); Gobolo, *Dlamini* (NBG 50980).

This second species, bearing long-tailed anthers, a very unusual character indeed, has smaller flowers than *G. calcaratus*. But for the caudate anthers this long-leaved variety appears to be close to *G. varius* var. *micranthus*. Some plants from Swaziland have the leaves distinctly hairy.

20. ***Gladiolus pole-evansii*** Verdoorn in Flower. Pl. Afr. **35**, t.1373 (1962). Type: Transvaal, Bronkhorstspuit district, near Bronkhorstspuit, *Pole Evans* 3907 (PRE, *holo.*, K. BOL).

Plants pubescent, about 1 m high. *Corms* depresso-globose, up to 6 cm in diam., thinly covered with fibres. *Leaves* in an elongated fan, 5–8, vaginate below for about 30 cm, linear, long acuminate, about 60 cm long and 1 cm

broad, strongly ribbed, minutely pubescent, becoming glabrescent towards the apex. *Spike* about as long as the leaves, 1–3 branched, rarely simple, scape enveloped in reduced, sheathing, long, acuminate, bract-like leaves, rhachis terete, woody, densely and minutely pubescent, pale buff. *Flowers* secund or distichous, up to 20 on the main branch, lateral branches shorter and fewer flowered, flowers fairly close together. *Bracts* narrowly ovate, 1,2 cm long, enveloping rhachis, minutely puberulous, pale buff. *Perianth* c. 3 cm long, pale pinkish lilac, minutely speckled with broken red lines; *tube* short, curved, funnel-shaped above; lobes spreading somewhat longer than the tube, more or less equal, ovate-lanceolate, 1,5–2,5 cm long. *Stamens* fairly long, reaching nearly to the apex of the slightly hooded dorsal lobe, anthers deep purple, very shortly caudate. *Capsule* oblongo-ovoid, 2,5 cm long; *seeds* large, oblong, 12 mm long, broadly winged.

Known only from a small area in the Bronkhorstspuit and Groblersdal districts of the Transvaal, on granite outcrops in mixed bushveld vegetation, flowering from February to March. The locality given by Pole Evans in 1936 is vague; the type gathering was very likely collected in the area where it was found recently.

TRANVAAL.—Bronkhorstspuit: near Bronkhorstspuit, *Pole Evans* 3907 (PRE, BOL, K). Groblersdal: Maloek-se-Kop, 7 km S.W. of Dennilton, *Codd* 2722, 9902 (PRE); 17 km N. of Verena, *Verdoorn* 2437 (PRE).

It is not closely related to any other known species and possesses some primitive characters such as the branched inflorescence and the small, fairly regular perianth.

Writing about the species in *Flowering Plants of Africa* Miss I. Verdoorn stated that it was first found in March 1936 by Dr Pole Evans, and that in March 1959 a special trip was made to examine the plants in their natural habitat and trace the distribution. It was found only in veld where outcrops of granite appeared, and on the steep granite hill, Maloek-se-Kop, many plants were in flower among the rocks and the range of variation was studied.

Verdoorn remarked that distinguishing features are the short dense pubescence on all parts except the flower, the moderately lax spikes with only 2 or 3 flowers open at a time, the general pale or 'dirty' pink to lilac colour of the flower with green near the base, and the segments minutely speckled to a varying degree with short red line-markings. She considers that the species is allied to *G. crassifolius*, an entirely glabrous plant, which was seen several times on the same trip but was absent from the granite hill. Besides the distinguishing characters mentioned by Miss Verdoorn, *G. pole-evansii* differs from *G. crassifolius* in having paler and less pointed bracts and bigger capsules with considerably larger seeds.

21. **Gladiolus stellatus** Lewis in Bot. Notiser **119** : 295 (1966) nom. nov. for *G. elongatus* Thunb., Prodr. 185 (1800), Fl. Cap. ed. Schultes 43 (1823),

exclud. syn. *G. tristis* Jacq.; Vahl, Enum. 2 : 81 (1806), pro parte; Roem. & Schult., Syst. Veg. 2 : 409 (1817); Ker, Gen. Irid. 136 (1827) excl. syn.; N.E. Br. in J. Linn Soc. 48 : 21 (1928); non Salisb. 1796. Type: Cape, Thunberg, 1020 (UPS, holo.).

G. tristis var. *e* Thunb., Diss. Glad. 12 (1784). *G. gracilis* sensu Bak., Fl. Cap. 6 : 141 (1896); non Jacq.

Geissorrhiza patersoniae L. Bol. in Ann. Bolus Herb. 1 : 32 (1915); Foster in Contr. Gray Herb. No. 135 : 71 (1941). Type: Cape, Port Elizabeth, Redhouse, Paterson 47 (BOL, holo., GRA, K).

Corm small, subglobose or ovoid, 0.8–1.8 cm diam., with tunics of pale to dark brown fibres, fine to fairly coarse and more or less reticulate above the base; 1 or 2 ovoid acuminate cormels with hard moulded tunics sometimes produced on short to long stolons at the base. *Stem* slender, simple or branched, usually flexuose, 15–75 cm high, average 25–50 cm, with a single obtuse hyaline sheath 2–9 cm long at the base. *Leaves* 5–7, distichous, the 2–3 basal usually reaching to the middle of the stem or base of spike or occasionally shortly above it, the sheaths narrowing abruptly into linear blades up to 1.5 mm wide with prominent margins and midrib, or occasionally subterete and sulcate; lower cauline like the basal but with longer sheaths and shorter blades and 1–2 upper much shorter, 6.5–1.5 cm long, the uppermost often reduced to a sheath. *Spike* distichous or secund, somewhat laxly 3–18-flowered, usually 6–9. *Bract* green or brownish, usually with narrow hyaline margins, thin, soft, sometimes submembranous, lanceolate or oblong, acute or obtuse, 2–1 cm long; bracteole with hyaline margins, shorter than bract, bidentate. *Flowers* very small, actinomorphic or almost so, somewhat star-shaped, fragrant, whitish to pale blue, mauve or greyish mauve, often greenish or brownish below, sometimes with a paler or deeper mauve median line on the lobes. *Perianth tube* straight, narrowly funnel-shaped, 4–6 mm long; *lobes* subequal and patent or the dorsal sometimes slightly larger than the others and suberect, all subunguiculate, elliptic, lanceolate or ovate-lanceolate, acute or acuminate, often mucronate, 1.3–2 cm long, 4–8 mm wide (sometimes smaller). *Stamens* erect, symmetrically arranged around the style, arising near middle of tube; filaments 6 mm long; anthers linear, subsagittate, 3.5–6 mm long. *Ovary* oblong or oblong-ovoid, 3–4 mm long; style reaching shortly above base of anthers, the branches spatulate, conduplicate, 2.5–4 mm long. *Capsule* ellipsoid or oblong-ovoid, pale, thin-walled, 1–1.5 cm long; *seeds* dark brown with broad pale brown wings, more or less oblong or oblong-orbicular, 6–7 mm long. (See fig. 9.)

Found in the south-eastern Cape from Swellendam to Port Elizabeth, where it is occasional in hard red clay or gravel soil on flats and hills, flowering from the end of August to November.

CAPE.—George: Great Brak River, Cassidy 238 (NBG); George, Barker 6857 (NBG); Georgetown, Prior (K); Wolwedrif, Malgat River, Burchell 6118 (K); George, am Waldrand zwischen Gebüsch und im

FIG. 9. *G. stellatus* Lewis (Lew 5633 NBG).

Wald, *Drège* 8419 (G, P, S). Heidelberg: Strawberry Hill, near Heidelberg, *Esterhuysen* 10434 (BOL); between Heidelberg and Suurbraak, *Lewis* 5656 (NBG). Humansdorp: near Loerie, *Rodin* 1089 (BOL, K); Suurbraak, *Fourcade* 3332 (K); sand dunes at Slang River, *Phillips* 3368 (K). Knysna: Knysna Heads, *Gillett* 2176 (BOL); Ashford, Belvedere, *Duthie* 1174 (BOL); Plettenberg Bay, *Rogers* 28235 (Z). Mossel Bay: Ruitersbos, *Van Niekerk* 70 (BOL); Mossel Bay, *Moyle Rogers* (K). Port Elizabeth: Redhouse, near Port Elizabeth, *Paterson* 47 (BOL, GRA, K, type of *Geissorhiza patersoniae*), *Fries*, *Norlindh* & *Weinmarck* 527 (K, S); near Port Elizabeth, *Fries*, *Norlindh* & *Weinmarck* 477 (SAM), *Marloth* 12604 (PRE); Theescombe, *Long* 1104 (K); Bethelsdorp, *Long* 242 (K). Riversdale: near Riversdale, *Bolus* 11385 (BOL, K), *Loubser* 872 (NBG), *Rogers* 4365 (Z); Albertinia, *Hayes* (NBG); 8 and 19 km S. of Riversdale on Blombos road, *Lewis* 5633, 5630 (NBG); near Fisheries, *Acocks* 21577 (K); Tierfontein *Galpin* 4724 (PRE). Swellendam: Soetkloof, *Walgate* 804 (SAM); Suurbraak road, *Wightman* (SAM 67321); mountains near Buffelsjags River, *Zeyher* 3990 (K, P, S, Z). Uniondale: 8 km W. of Avontuur, *Gillett* 1598 (BOL); De Hoop, *Esterhuysen* 6559 (BOL). Without locality: *Thunberg* sheet 1020 (UPS); *Verreaux* (G).

This slender and rather insignificant small-flowered species was first found nearly two hundred years ago by Thunberg, who placed it as one of the many varieties (var. *e*) under *G. tristis*, but four years later he named it *G. elongatus*. In his paper on the *Iridaceae* of Thunberg's Herbarium, published in 1928, N. E. Brown stated that he could not find any specimen in Kew Herbarium to match Thunberg's plant, and that Thunberg's name must be retained for the species which evidently was nearly allied to *G. permeabilis*. While it is true that it did not match any species placed under *Gladiolus* at that date, there were specimens named *Geissorhiza patersoniae* in Kew Herbarium and, had these been examined, Brown would no doubt have found that it matched some of them. In 1957 Prof. T. Norlindh noted on Thunberg's type sheet in Uppsala that '*Geissorhiza patersoniae* L. Bol. seems to be identical with *Gladiolus elongatus*'.

Unfortunately Thunberg's name cannot be retained, having been used by Salisbury for another plant four years earlier (*G. elongatus* Salisb. 1796 = *Babiana tubulosa* (Burm. f.) Ker var. *tubiflora* (L. f.) Lewis). As a species of *Gladiolus* was named after Mrs Paterson in 1928 her name could not be given to this one and, since a new name was required, the epithet *stellatus* was chosen on account of the unusual star-like appearance of the flowers. Occasionally the dorsal lobe is slightly larger and raised a little above the other five, but more often the lobes are more or less equal and evenly spread.

The small regular flower, with its erect stamens symmetrically placed round the style, and the thinness of the bracts, are characteristic of *Geissorhiza* rather than *Gladiolus*, and it was this resemblance to *Geissorhiza* which decided Louisa Bolus to place the species in that genus when she described it as new in 1915, naming it after Mrs F. Paterson of Port Elizabeth, who collected it in that area. She described the broadly winged seeds and remarked that the species showed some affinity to *Gladiolus*, but added that 'living material exhibits the regular perianth and equilateral stamens characteristic of *Geissorhiza*'. According to Dr T. T. Barnard, who has grown this species in Dorset, England, the flowers remain open for a few hours during the day and close up towards the evening.

Although regular flowers are rare in *Gladiolus* they do occur in two or three species and there is no doubt that this is another of the few exceptions. In

some of her papers on the Iridaceae Lewis remarked on the fact that the symmetry of the flower by itself is not always an entirely satisfactory generic character, and that the other organs of the plant must be taken into consideration as well. In the plant under discussion the corm, slender stem, leaves, bracts and broadly winged seeds bear no resemblance to those of any species of *Geissorhiza*, whereas they are very similar to those of *Gladiolus permeabilis*, and she agreed with N. E. Brown in regarding it as being nearly allied to that species.

In the *Flora Capensis* Baker placed *G. elongatus* Thunb. as a synonym of *G. gracilis* Jacq. but it has no affinity with that species. No doubt he was misled by the fact that Thunberg cited a figure of Jacquin's (Ic. t.244), which is probably a small form of *G. gracilis*. It certainly is not *G. elongatus* Thunb., nor is it a variety of *G. tristis* as named by Jacquin.

22. **Gladiolus gueinzii** Kunze in *Linnaea* **20** : 14 (1847); Klatt in *Abh. Nat. Ges. Halle* **12** : 340, *Ergänz.* **6** (1882); Dur. & Schinz, *Consp. Fl. Afr.* **5** : 218 (1893). Type: Natal, Durban (Port Natal), *Gueinziius* 490 (sphalm. 460; S, neo, NBG, photo.). (See fig. 10.)

G. blandus Soland. var. ? *gueinzii* Bak. in *J. Linn Soc.* **16** : 175 (1877).

G. sabulosus Lewis in *Jl S. Afr. Bot.* **7** : 31 (1941), nom. nov. for *Acidanthera brevicollis* Bak.; *Acidanthera brevicollis* Bak. in *J. Bot., Lond.* **14** : 339 (1876), *Handb. Irid.* 187 (1892), *Fl. Cap.* **6** : 134 (1896). Type: E. Cape, Bathurst district, Fish River, MacOwan 1890 (K, holo.).

Corm subglobose, 1,4–2,5 cm diam., with thin reddish brown submembranous tunics. *Stem* firm, moderately slender, 20–75 cm long, usually 30–55 cm, occasionally branched, flexuose, sheathed by leaves to base of spike, with 2 subacute pale or dark brown, membranous, basal sheaths up to 15 cm long, often completely disintegrated at flowering time. *Leaves* 6–8, the 3–5 basal linear, overtopping the stem, 3–5 mm wide, thick and somewhat fleshy with slightly prominent margins and midrib, becoming leathery and sometimes striate when dried, often with cormels in the axils; cauline leaves much shorter, the uppermost reduced to a bract-like acute or subacute sheath 3–7 cm long. *Spike* secund or subdistichous, fairly laxly 1–7-flowered, usually 3–4. *Bract* slightly fleshy, oblong or ovate-oblong, acute or subobtuse, 3–1,8 cm long; bracteole similar to bract but slightly shorter and usually minutely bidentate. *Flowers* small, actinomorphic or almost so, pink with purple markings or pale to dark mauve or purplish with a red lanceolate mark from the base to above the middle of the lobes, usually broader and with a white central stripe on the 3 lower and often 1 of the upper laterals. *Perianth tube* 0,8–1,5 cm long, subcylindrical, very little widened towards the throat, straight or slightly curved; *lobes* obovate or 3 inner somewhat rhomboid-obovate, all tapering to the base and subunguiculate, the 3 outer subequal, obtuse, sometimes slightly retuse, 2–2,3 cm long, 1–1,3 cm wide; 3 inner equal, obtuse or subacute, 2,1–2,3 cm



FIG. 10. Neotype of *G. gueinzii* Kunze (herb. Klatt, S).

Photo: By courtesy of Prof. T. Nordlindh, Stockholm.

long, 0.7–1 cm wide. *Stamens* arising 1–2 mm below top of tube, erect, symmetrically disposed or all directed to one side; filaments 0.8–1.2 cm long; anthers linear, subsagittate, 5–6 mm long. *Ovary* oblong or ellipsoid, 4–6 mm long; style reaching middle or top of anthers, with oblanceolate branches 3–5 mm long. *Capsule* ellipsoid, 2.3–3 cm long; *seeds* pale yellow-brown, broadly winged, suborbicular, about 1–1.2 cm long.

A psammophilous species found on the coastal dunes from the George district to southern Natal, flowering from October to December.

CAPE.—Bathurst: Port Alfred, *Rogers* 30137 (Z), *Tyson* in herb. Marloth 8512 (PRE); Fish River, *MacOwan* 1890 (K—type of *Acidanthera brevicollis*); Kowie West, *Tyson* (BOL). East London: Keiskamma, *Hutton* (K); East London, *Rattray* 226 (K), *Bokelmann* (NBG); Buffalo River, *Murray* (SAM 21116); Bats Cave, *Rattray* in herb. Muir no. 4534 (PRE); near Gonubie River, *Carter* NBG 2375/30 (BOL); Christmas Rock, *Bokelmann* (NBG), *Acocks* 21840 (PRE). George: Wilderness, *Van Niekerk* 173 (BOL, LD); Swartvleistrand, *Martin* 64 (NBG). Humansdorp: Groot River, *Taylor* 2925 (PRE), *Fourcade* 5787 (BOL). Kentani: Kentani district, *Pegler* 817 (BOL, K, PRE). Knysna: Grooterivier, *Hill* (K), *J. Phillips* 1201 (BOL); Keurboomstrand, *Seytler* NBG 1471/38 (NBG), *Barker* 6059 (NBG), *Wurts* 2011 (NBG); Plettenberg Bay, *Lewis* 6167 (NBG); Buffels Bay, 13 km W. of Knysna, *Thomas* (NBG). Komga: near Kei River mouth, *Flanagan* 2373 (BOL, GRA, PRE, K). Port Elizabeth: Port Elizabeth, *Holland* (BOL).

NATAL.—Durban: Isipingo, *Wood* 9103 (BOL, SAM); Durban (Port Natal), *Gueinzii* 490 (S), 39 (P), s.n. (K, LE, P), *Rudatis* 1507 (BM, K), *Wood* 1092 (K, SAM); Umgeni River mouth, *Stainbank* 55 (BM, SAM), *Wood* 55 (K).

WITHOUT LOCALITY: *Saunders* (K); *Cooper* 3197 (K); *Hutton* (K—locality 'Katberg' on label cannot be correct).

G. gueinzii is an unusual species with an uncommon habitat, not very closely related to any other and the only one which is known to occur only on coastal dunes. It has been recorded from many of the sandy beaches between the Wilderness in the George district and a little north of Durban, a distance of several hundred kilometres. Like many other littoral plants it has somewhat thick and fleshy leaves, and its pink, mauve or purplish flowers marked with red are small and regular or almost so. Kunze described them as 2½–3 inches long but this should read 2½–3 cm. He gave no measurement for the bract but stated that the perianth tube was much shorter than the spathe.

As Kunze's collection in the Leipzig herbarium was destroyed during World War II a sheet of *Gueinzii* no. 490 in Klatt's collection in the Natural History Museum Herbarium, Stockholm, named *G. gueinzii* Kunze by Klatt, is selected as the neotype. The number on the label is 490 and not 460 as published by Klatt when he cited these specimens under *G. gueinzii*.

Baker placed *G. gueinzii* as a synonym of *Acidanthera brevicollis* Baker, which was transferred to *Gladiolus* in 1941 under the new name *G. sabulosus* Lewis, the name *G. brevicollis* having already been used. At that time it was stated that if Baker was right in considering *G. gueinzii* to be the same as *Acidanthera brevicollis* he should have named it *A. gueinzii*, but from the descriptions it does not appear that they could be the same. However, having now seen Klatt's specimens in Stockholm, and knowing that both he and Baker considered the species described here to be *Gladiolus gueinzii* Kunze, it is assumed that this is correct and that the discrepancy in the size of the flower mentioned above must

be due to some error in the original description, where the measurements may have been recorded in inches instead of centimetres.

23. *Gladiolus acuminatus* Bol. f. in Ann. Bolus Herb. **2** : 100 (1917). Type: Cape, ex Caledon Wild Flower Show (BOL 14793 holo., BM, G, K, PRE, Z).

Corm ovoid or subglobose, 0.8–1.5 cm diam., with tunics of fine brown fibres connate above the base, sometimes in 2 or 3 imbricating layers. *Stem* firm, slender or moderately slender, flexuose, 25–60 cm long, simple or 1–2-branched, with a single hyaline obtuse or subacute sheath 2.5–7 cm long at the base. *Leaves* 5–10, the 2–5 basal with short sheaths and linear blades 1–2 mm wide reaching to middle of stem or a little above, occasionally nearly to the spike; lower cauline like the basal but half or more sheathing and upper 1–2 much shorter, the uppermost 3–10 cm long. *Spike* secund, 2–10-flowered. *Bract* oblong-lanceolate or oblong, acuminate or acute, 3.5–1.5 cm long, 8–5 mm wide; bracteole oblong, bidentate, 1.8–1 cm long. *Flowers* fragrant, smallish, tubular with tapering recurved lobes, dull greenish yellow with a green or dull brownish median line on the lobes. *Perianth tube* erect, curved near the middle, 2–2.9 cm long, the lower half very slender, cylindrical, and upper subcylindrical, 4–6 mm diam. at the throat; *lobes* alike, 2–2.5 cm long or the dorsal occasionally up to 2.8 cm, unguiculate, the claws connivent or sometimes more or less connate, the blades ovate-lanceolate or lanceolate, acuminate, the dorsal slightly hooded at the base 0.8–1.4 cm wide, the upper laterals slightly smaller and 3 lower subequal or the laterals slightly larger than the lowest, 5–8 mm wide, with very slender claws connate for 4–6 mm or sometimes up to the blades. *Stamens* subarcuate, arising 5–6 mm below top of tube; filaments 0.8–1 cm long; anthers linear, subsagittate, 5–7 mm long. *Ovary* ellipsoid 4–6 mm long; style reaching to middle or top of anthers, the branches more or less linear-oblong or clavate, 2–4 mm long. *Capsule* ellipsoid, 1 cm long; seeds small, dark brown with narrow paler wings, rhomboidal, oblong or suborbicular, 3–4 × 2.5–3 mm.

Restricted to the southern Cape coastal districts of Caledon and Bredasdorp, where it is occasional on stony gravel slopes, flowering in August and September.

FIG. 11. From a painting by G. J. Lewis. — 1, corm and leaves; 2, inflorescence; 3, capsule, × 2; 4, seed, × 2; 5, flower laid out; 6, top of style and stigmas, × 3; 7, stamen, × 2; 8, bract; 9, bracteole.

Cape.—Bredasdorp, Fairfield, Lewis 6086 (NBG). September 1962.

CAPE.—Bredasdorp: Fairfield, Thomas (NBG), Lewis 6086 (NBG); between Napier and Oudekraal, Acocks 15496 (BM, K, PRE); between Napier and Caledon, Sidey 1839 (S, PRE). Caledon: Onrus, Esterhuysen (BOL 21476, BOL, PRE); Diepgat (Caledon Wild Flower Show), comm. Pillans (BOL 27519); without precise locality, Caledon Wild Flower Show (BOL, BM, G, BOL 14793, K, PRE, Z), comm. L. Bolus (SAM 10230), comm. Leighton (SAM 54136).

G. acuminatus was originally described from unlocalized plants exhibited at the Caledon Wild Flower Shows in 1915 and 1916, but since then has been

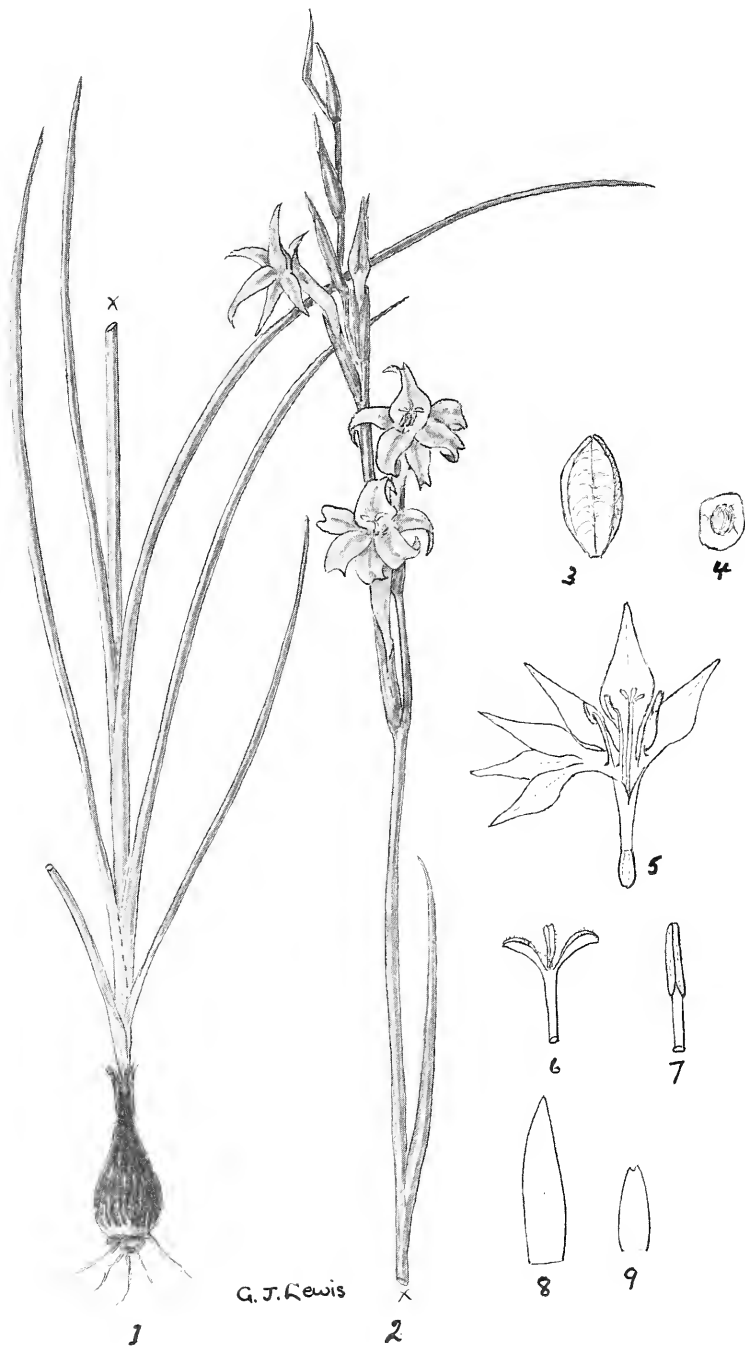


FIG. 11. *G. acuminatus*.

recorded from three areas within a 50 to 65 km radius in the Caledon–Bredasdorp districts, so appears to have a rather restricted distribution.

The small and somewhat insignificant but very sweetly scented flowers do not closely resemble those of any other species. The lobes have long slender claws which, when free, are not very evident as they are more or less connivent, while in some flowers they are partly coherent and in others, among them the type specimens, they are connate almost to the base of the blade and the upper half of the perianth tube is subcylindrical. Although the perianth tube is unusually long, the combined characters of the corm, leaves, unguiculate perianth lobes and small rather narrowly winged seeds are like those of the *permeabilis*–*edulis* group, to which *G. acuminatus* evidently belongs.

24. *Gladiolus lapeirousioides* Goldblatt in Jl S. Afr. Bot. **37** : 229 (1971). Type: Cape, Loeriesfontein, 2 km along road to Kliprand from Loeriesfontein to Nieuwoudtville, *Goldblatt* 540 (BOL, holo., PRE, NBG).

Plants small, up to about 15 cm tall. *Corm* ovoid *c.* 1 cm in diam. but enlarged by the hard tunics disintegrating into pointed and clawed fibres, harbouring sessile black ovoid pointed cormlets. *Prophyll* 1, membranous, subterranean. *Leaves* usually 3, sheathing the short subterranean stem, the free falcate blades emerging together at ground level at the base of the flowering spike; the lowest leaf linear, about 15 cm long, 2–3 mm wide with a distinct midrib, the second more or less similar but the third about half the size. *Spike* bent outwards, the second flowers closely arranged in an arched spray, occasionally with a basal branch; bracts placed at right angles to the scape, narrowly lanceolate-acuminate, about 16 mm long, sheathing the lower part of the tube. *Perianth* salver-shaped, long-tubed, delicate, white, with the lower lobes each bearing 2 red blotches and V-shaped lines near the throat; tube narrowly cylindrical, 3,5–4,5 cm long, 1,5 mm diam. at the throat; upper lobes lanceolate, *c.* 16 mm long and 5 mm broad, spreading and slightly reflexed near the base; lower somewhat shorter and half as wide. *Stamens* exserted, reaching the middle of the upper lobe, anthers about 5 mm long, the 3 stigmas just overtopping them. *Capsule* ovoid, *c.* 1 cm high, chartaceous; *seeds* few, 2,5 mm in diam., broadly winged.

Known only from the type locality; near Nieuwoudtville growing on shaly gravel flats, *Goldblatt* 540, flowering September 1970; in seed December 1970, *Toelken* s.n. sub PRE 31075 (PRE).

At first sight one might mistake this species for a *Lapeirousia* because of its delicate, small, long-tubed perianths but this impression is soon dispelled when seeds are examined for these are winged and typical of *Gladiolus*. In all other respects it also conforms to this genus. Its small suppressed stature with falcate leaves and spike bent sideways is reminiscent of plants of other species found in this area, e.g. *G. arcuatus*, *G. virescens*, *G. scullyi*, etc. It is probably an adapta-

tion to a harsh exposed habitat for in more shady and moist positions they will become taller and more erect.

25. *Gladiolus leptosiphon* Bol. f. in Ann. Bolus Herb. **1** : 196 (1915). Type: Cape, Cape Town Wild Flower Show, amongst plants from Oudtshoorn and Riversdale districts (BOL 13754, holo., PRE).

Radinosiphon leptosiphon (Bol. f.) N.E. Br. in Trans. R. Soc. S. Afr. **20** : 263 (1932).

Corm ovoid, 1,3–1,8 cm diam., with tunics of pale brown rather coarse vertical fibres in 1 or 2 imbricate layers, more or less connate and irregularly thickened above. *Stem* slender, simple or branched, 28–70 cm high, usually 35–60 cm, with remnants of 1 or 2 hyaline sheaths at the base. *Leaves* 5–7, the basal with short to fairly long sheaths and long narrow linear blades usually reaching to the spike or above it, 1–2,5 mm wide, with more or less prominent margins and midrib, occasionally subterete and sulcate; lower cauline similar to basal but with longer sheaths and shorter blades, the 1–2 upper 2,5–18,5 cm long, the uppermost usually reduced to an acute or acuminate sheath. *Spike* distichous or secund, laxly to fairly closely 3–10-flowered, the flowers erect. *Bract* lanceolate or oblong-lanceolate, acuminate or acute, 3,5–1,8 cm long, soft, pale green sometimes suffused with purple; bracteole shorter, submembranous, usually minutely bidentate. *Flowers* long-tubed, smallish, 0,7 cm long, bilabiate, cream, creamy-yellow or creamy-brown with a short dark purplish medial line in lower half of 3 lower lobes. *Perianth tube* slender, 3,5–5 cm long, subcylindrical, slightly expanded upwards with a slight bend near the top and sometimes narrowly funnel-shaped above; *lobes* tapering to obtuse or subacute tips, the 3 upper subequal or dorsal slightly wider and shorter than laterals, somewhat ovate-lanceolate, 2–3 cm long, 0,7–1 cm wide, the lower half of dorsal hooded, becoming erect above, the laterals patent, shortly connate to lower laterals at the base; 3 lower more or less recurved, unequal, lanceolate, connate for 2–3 mm, the lowest up to 3 cm long and 5 mm wide and laterals up to 2 cm long and 3 mm wide. *Stamens* arcuate, arising 3–5 mm below top of tube; filaments 0,8–1 cm long; anthers linear, subsagittate, 5,5–7 mm long. *Ovary* oblong, 3–4 mm long; style reaching nearly to top of anthers or shortly above, the branches spatulate or obovate, conduplicate, 1–1,5 mm long. *Capsule* (not fully mature) ellipsoid, pale, thin-walled, about 1,8 cm long; *seeds* pale-brown, broadly winged, somewhat irregularly sub-orbicular or oblong-orbicular, 5 mm long.

A rare species recorded from the Oudtshoorn, Prince Albert, and Ladismith districts in the Cape, where it inhabits stony hills and low mountain slopes, flowering from September to November.

CAPE.—Ladismith: Seven Weeks Poort, Wurts 1649 (NBG). Oudtshoorn: hills at Cango Caves, Lewis 6170 (NBG), Oudtshoorn, Taylor (BOL 16892), Stayner (NBG); Meiringspoort, Acocks & Hafström 297 (S, PRE). Prince Albert: Prince Albert, Matheus (BOL 14853). Without locality: Cape Town Wild Flower Show, 1914, among plants from Riversdale and Oudtshoorn Divisions (BOL 13754); ditto, 1915, (BOL 14861).

This species was transferred to *Radinosiphon* by N. E. Brown when he established this genus. It is however a true *Gladiolus* in all respects, including the winged seeds. In *Radinosiphon* the seeds are globose, minutely tuberculate, brown and shiny.

The exact locality for *G. leptosiphon* was not known at the time when it was first described, from plants sent from the Riversdale–Oudtshoorn Divisions for exhibition at the Wild Flower Show in Cape Town in October 1914. Since then it has been collected at the localities cited above, but it is by no means common and further material and information are required. It is closely allied to *G. involutus* (syn. *G. muiirii* L. Bol. 1915, not 1924) but, as was pointed out by Bolus f., it differs in the narrower leaves, more slender, longer and straighter perianth tube and narrower lobes.

In the Bolus Herbarium there are two sheets of incomplete unlocalized specimens (No. 15040) which were exhibited at the Cape Town Wild Flower Show in October 1916, among plants from the Riversdale Division. There are no lower leaves on these specimens which resemble *G. leptosiphon* but the plants are sturdier, more branched and the bracts are longer. The long-tubed flowers are very similar to those of *G. involutus*, with the dorsal lobe shorter than the two upper laterals, and differ only in having a much longer tube. These plants appeared to be intermediate between *G. involutus* and *G. leptosiphon*.

Early in September 1971, a collecting expedition from Kirstenbosch found a large population of *G. involutus* on the roadside about 12 km south of Herbertsdale. The site was visited again on 19 October when the first capsules were already in ripe seed though the last flowers on the side branches had only recently faded. Some 500 m to the south a small population of *G. leptosiphon* was coming into flower. On examination, these plants appeared to be a hybrid swarm. The long-tubed flowers were creamy yellow, some marked with the dark medial line on the lower lobes characteristic of *G. leptosiphon*, others with the pink transverse band like *G. involutus* and one plant (NBG 93402) growing a little apart from the others had shorter tubed flowers flushed with pink and seemed therefore nearer to *G. involutus*. The specimens collected (NBG 93401) were compared with those from the 1916 Wild Flower Show on the two sheets in the Bolus Herbarium and found to match them exactly—and it is possible that they were actually collected from this site. No pure populations of *G. leptosiphon* have been reported from the Herbertsdale area and the nearest known sites are some 60–75 km to the north. It is probable however that the species does extend southwards down the Gouritz River valley and that other hybrid swarms between these two closely related species may yet be found in this area.

Also in the Bolus Herbarium (and National Herbarium, Pretoria) are a few specimens collected by Miss E. Esterhuysen on the lower slopes of the Cockscomb, Great Winterhoek Mts, in the Uitenhage district, which appear to be very near *G. leptosiphon* and may be a variety or a new species closely allied to it. The specimens, *Esterhuysen* 28044, have no corms, nor has a flower

been dissected, but as far as can be seen the flowers differ from those of *G. leptosiphon* in having much wider lower lobes, the laterals up to 8 mm and lowest possibly slightly more, and the upper laterals, which are connate to the lower for about 5 mm, are very similar to them in size and shape, while the dorsal appears to be considerably wider. More material is required for the plants to be described and allocated to their proper position.

26. **Gladiolus vigilans** Barnard, sp. nov.

G. prismatosiphon sensu Lewis in Adamson & Salter, Fl. Cape Penins. 259 (1950); sensu Kidd, Wild Flrs of the Cape Penins. t.83 f.1 (1950); sensu Lewis Flower. Pl. Afr. t.1160 (1953) as to illustration and description and text pro parte, non Schlechter (1900).

Gladiolus vigilans Barnard sp. nov. *G. carneo* Delaroche affinis sed tunicis cormi pectinatis, ad apicem spinosis, foliis duobus teretibus, elongatis; spica 2–3 flora, tubo perianthii elongato, anguste tubiformi differt.

Planta erecta 30–40 cm alta. *Cormus* depresso-globosus c. 2 cm diam. tunicis solidis lignosis pectinatis. *Folia* basalia 2 teretia filiformia ad 40 cm longa, ad basin vaginantia, costa et margine incrassato flavo; folium tertium reductum, folium quartum bracteae simile. *Spica* 1–3 flora; bracteae anguste lanceolatae 2–3 cm longae. *Perianthium* oblique infundibuliforme, 5–6 cm longum; tubus anguste tubulosus ad 4 cm longus; lobi superiores inferioribus duplo majores 2,5 cm longi et 2 cm lati.

Type: Cape Peninsula, Vasco da Gama Ridge near Cape Point, *Lewis* sub SAM 54296 (SAM, holo., PRE).

Plants erect, 30–40 cm high. *Corm* depresso-globose, about 2 cm in diam. with hard pectinate tunics terminating in basal spines. *Basal leaves* 2, terete, fine, overtopping the spike, up to 40 cm long, vaginate near the base, midrib and margin sclerotic. raised, yellow; third leaf somewhat reduced, fourth bract-like. *Spike* 1–3-flowered, bracts narrowly lanceolate, acute to acuminate, 2–3 cm long. *Perianth* obliquely funnel-shaped, 5–6 cm long, with a thin long tube and spreading limb, pale rose pink with spade-shaped marks on lower smaller lobes; tube narrowly tubular, up to 4 cm long, slightly widened at the throat; upper lobes about twice as large as lower, dorsal broadly ovate, obtuse, c. 2,5 cm long and 2 cm broad, slightly hooded and broader than spreading upper laterals, lower lobes spreading, recurved. *Capsule* unknown.

Recorded only from the type locality at Cape Point with one collection from the Kogelberg in the Caledon district.

FIG. 12. From a painting by G. J. Lewis. *Flower. Pl. Afr.* t.1160 (1953) published as *G. prismatosiphon* Schltr.—1, corm and inflorescence; 2, bract; 3, bracteole; 4, flower front view; 5, longitudinal section of flower.

Cape.—Cape Peninsula, Vasco da Gama Peak (type site) *Lewis* 670 (SAM). November 1939.

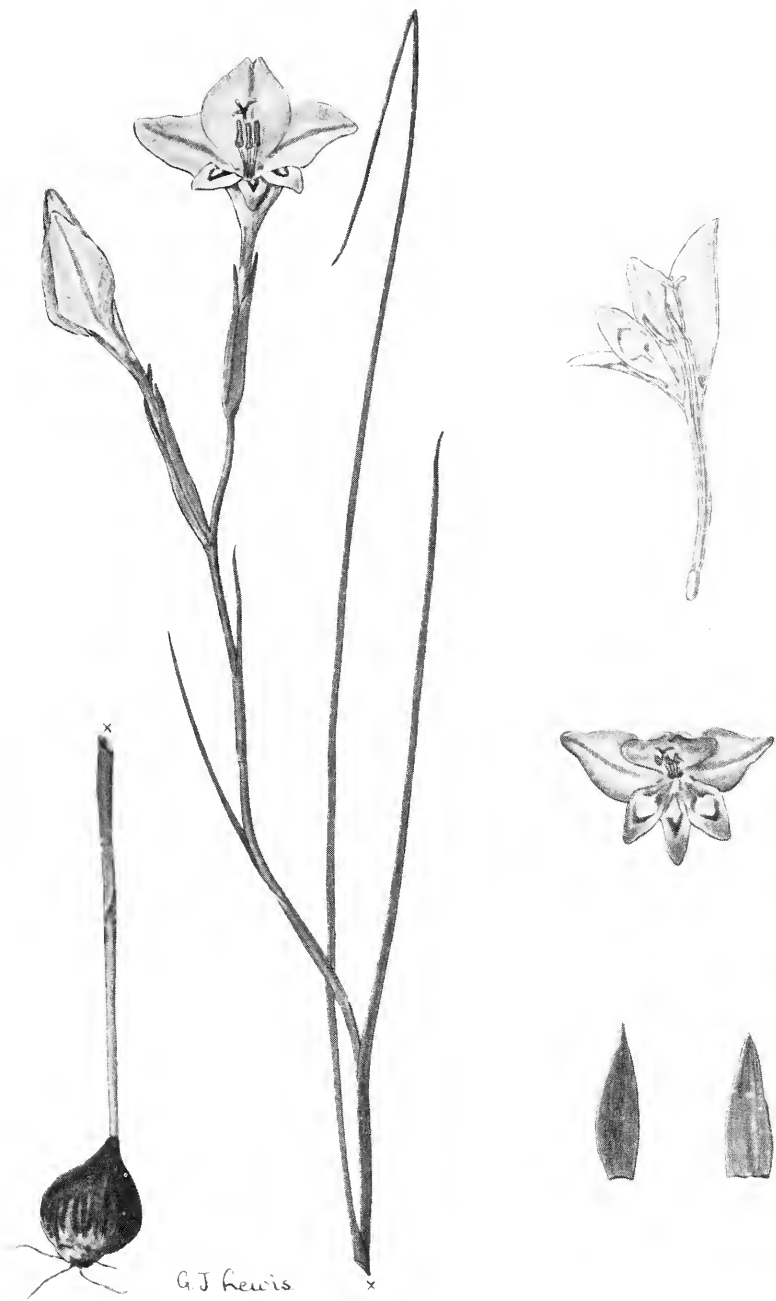


FIG. 12. *G. vigilans*.

CAPE.—Cape Peninsula: Cape Point, *Mortensen* 126 (C)—fide Lewis; Vasco da Gama Peak, *Salter* 2851 (BOL, K, BM); Vasco da Gama Ridge, *Lewis* sub SAM 54296 (SAM, holo., PRE); *Barnard* (NBG 91321); Matrooskloof, top of ridge, *Taylor* 6553 (NBG). Caledon: Kogelberg, *Stokoe* (SAM 55641).

The species was first collected by Mortensen in 1930 and then by Salter in 1931 when it was identified as *G. prismatosiphon* Schltr. The type specimens were collected by Lewis also from Vasco da Gama Peak in 1939. She published a description of the species under the name of *G. prismatosiphon* in Adamson & Salter's *Flora of the Cape Peninsula* (1950), and three years later in the *Flowering Plants of Africa* she illustrated the Vasco da Gama plant citing Schlechter's type, and collections from the Mostert Hoek Twins, and the Kogelberg. After her visit to Europe in 1965 when she had an opportunity of seeing Schlechter's specimens in Berlin and at the British Museum and Kew, she concluded that the Vasco da Gama plant was not the same species: but at the time of her death she had not rewritten her description nor suggested a new name.

In November 1970 *G. prismatosiphon* Schltr. was found in flower on the hills between Bredasdorp and Napier near Schlechter's (1896) type site: and it was possible to compare it with fresh material of the Vasco da Gama plant. They are very distinct. *G. prismatosiphon* has soft corm tunics, linear leaves, an arching 4–5-flowered spike often with a side-branch and despite its long noticeably hexagonal tube (hence Schlechter's specific name) is referable to the *G. carneus* complex and has been cited in synonymy under that species (q.v.). The Vasco da Gama plant is here named *G. vigilans*, the watcher or sentinel, from its type site on the peak looking out over the Atlantic and False Bay. It is clearly distinguished from all forms of the *G. carneus* complex by its hard clawed corm tunics and its long subterete leaf overtopping the slender erect 2–3-flowered spike.

Lewis had transferred the plants from the Mostert Hoek Twins to her new species *G. cylindraceus*, and the only collection from outside the Peninsula is Stokoe's (1939) from the Kogelberg, without corms, but the leaves and flower spikes exactly match the type specimens.

27. *Gladiolus macneilii* Oberm. sp. nov. distincta.

Cormus ovoides fibrosus. *Folia* basalia 4 distincta linearia c. 60 cm longa et 5 mm lata mollia. *Spica* erecta secunda densa c. 18-flora; bracteae lineari-lanceolatae acuminatae 4 cm longae, bracteolae minores bidentatae. *Perianthium* ad 9 cm altum fragile pallide roseum; tubus strictus subgenuflexus ad faucem paulo amplior; lobi superiores ovati longe acuminati 35 mm longi; lobi inferiores minores costa rubra notati. *Antherae* purpureo-nigrae. *Capsula* oblongo-ovoides 2 cm longa, rubro vel brunneo-maculata; semina oblonga 6 mm longa alata. Type: Transvaal, Pilgrim's Rest, Abel Erasmus Pass, mountain slopes, *McNeil* & *Mauve* 4788 (PRE, holo, NBG, K).

Corm ovoid, 2.5 cm in diam. covered with soft pale brownish fibres. *Leaves* 4, distichous, linear, c. 60 cm long and 5 mm broad, with a lax twist, soft in

texture; apex acute, midrib and margins yellow, slightly prominent; upper cauline about 3, reduced, sheathing. *Spike* just exerted above the leaves, in well-developed plants with 1–2 short, basal side-branches, second, bearing usually 12(–17) flowers with a number open at the same time; scape and rhachis terete, firm. *Bract* narrowly lanceolate acuminate, erect, lower up to 5 cm long, upper smaller, membranous, pale pinkish brown; bracteole somewhat shorter, bidentate. *Perianth* *c.* 8 cm long, pale salmon pink, the lower lobes with a bright red median stripe; tube narrow about 4 cm long, subgeniculate and widened near the throat, becoming somewhat vertically compressed and funnel-form at the bilabiate mouth; the upper lobes porrect, lanceolate 2,5 cm long, 1,5 cm broad, apex long acuminate, the upper hooded, the lateral spreading outwards; 3 lower lobes forming a triangular, long tapered lip with the apices curled backwards with age, narrowly lanceolate 2 cm long, 6 mm broad with the central deep red line fading towards the long-acuminate apex, laterals placed above the lower central lobe which is somewhat longer. *Stamens* placed against the upper hooded lobe, with the anthers 12 mm long, deep purple, apiculate above and shortly caudate below. *Capsule* oblongo-ovoid, 2 cm long, chartaceous, spotted with reddish or brownish speckles; *seed* oblong, 6 mm long, winged.

A rare endemic from the eastern Transvaal, Abel Erasmus Pass, in dolomite in loose red soil on grassy slope in bushveld, alt. *c.* 1 300 m, flowering in April.

This distinctive species is not closely related to any of the Transvaal species. It somewhat resembles the Cape species *G. angustus* and *G. undulatus* but differs in many respects. The flowers soon close after picking.

It was a pleasure to name this species after its discoverer, Mr P. Gordon McNeil, whose interest in our flora and cordial co-operation have always been much appreciated by botanists far and wide.

28. ***Gladiolus microcarpus*** Lewis sp. nov., *G. floribundo* affinis sed plantis elatioribus, bracteis et floribus minoribus, perianthii tubo ad faucem angustiore, foliis pubinerviis differt.

Cormus parvus, subglobosus 2 cm crassus tunicis fibrosis. *Folia* 6–7 ad basin longe vaginantia elongata anguste lanceolata ad 1 m longa et 15 mm lata pubinervia. *Spica* laxa 5–11 flora subdisticha vel secunda flexuosa; bracteae lanceolatae ad 2 cm longae submembranaceae. *Flos* delicatus roseus ad 8 cm longus lobis tubum aequantibus; tubus angustus ad faucem paulo amplior; lobi acuminati, dorsalis ellipticus, ceteri lanceolati subaequales. *Capsula* subglobosa 15 mm longa; semina 5 mm longa alata.

Type: Natal, Bergville district, Cathedral Peak Forest Station, Indumeni River valley, on cliffs, *Killick* 1655 (PRE, holo.). (See fig. 13.)

Plants usually pendulous, 1 m tall. *Corm* subglobose, *c.* 2 cm diam., with thin membranous tunics disintegrating into fine fibres. *Prophylls* 2, sheathing, up to 15 cm long. *Leaves* 4–5, forming a long sheathing 'stem' covering the scape



FIG. 13. Type of *G. microcarpus* Lewis (Killick 1655. PRE).

Photo: National Herbarium, Pretoria.

nearly to the apex, the blades forming a flaccid fan, linear acuminate, *c.* 60 cm long, 1 cm broad, the 6–8 ribs prominent, bearing minute, sparse, short, spreading golden hairs. *Spike* laxly 5–11 flowered, secund or subdistichous, occasionally branched, rhachis flexuose. *Bract* free from rhachis, enveloping the tube, narrowly lanceolate, acute to acuminate, *c.* 2 cm long, membranous pale green, faintly striate; bracteole smaller, shortly bidentate. *Flowers* medium-sized, delicate, long-tubed, whitish or pink or mauve, with dark pink or reddish median stripes on lower half of lower lobes. *Perianth tube* 3–4.5 cm long, straight or slightly curved, very slender and subcylindrical, only very slightly expanded towards the throat; *lobes* acuminate, the dorsal elliptic 3–4 cm long, the others more or less lanceolate, 2.5–3.5 cm long, subequal. *Stamens* subarcuate, arising near top of tube and reaching middle of dorsal lobe. *Capsule* subrotund 15 mm long, pale yellowish brown, fairly firm; *seeds* oblong, 5 mm in diam., brown with fairly wide wings.

Apparently an endemic in the Natal Drakensberg found at high altitudes (1 800–2 700 m) where it grows in moist crevices, the lovely spikes hanging over the edges of perpendicular cliffs. It flowers in January–February.

NATAL.—Bergville: Cathedral Peak Forest Station, Indumeni River, *Killick* 1655 (NBG, PRE); Mahai Valley, *Pardoe* (PRE); summit of Little Berg, Cathkin Park, *Galpin* 11741 (PRE), *Urban* (ex Galpin; BOL); Mont-aux-Sources, *Thode* (STE), *Trauseld* 159 (PRE); Giant's Castle Game Reserve, Injasuti area, *Trauseld* 793 (PRE).

This attractive, rather delicate species somewhat resembles *Hesperantha grandiflora* Lewis, which is found in the same type of habitat, but the latter can be distinguished *inter alia* by the long style-branches, wingless seeds and flattened corms. Trauseld in his book, *Wild Flowers of the Natal Drakensberg* 47 (1969), incorrectly quotes this *Hesperantha* as a synonym. Incidentally his collector's number is 793, not 973. In the National Herbarium, Pretoria, there are a few specimens which bear a close resemblance to *G. microcarpus* and may be garden hybrids derived from it or possibly a stronger variety. The plants are very much sturdier with the stem branched and minutely pubescent, and the bracts firmer, wider and also minutely pubescent. The origin of two of the specimens is not known but a third incomplete plant is recorded from the Wakkerstroom district in the Transvaal, unfortunately with no further particulars. It is not certain whether the last is of garden origin or not, though Lewis was inclined to think it might be as it is unlikely that there would be no other records from the wild of such a striking and attractive plant.

29. ***Gladiolus buckerveldii*** (L. Bol.) Goldblatt, in Jl S. Afr. Bot. **37** : 443 (1971).

Antholyza buckerveldii L. Bol. in Ann. Bolus Herb. **4** : 118 (1927). Type: Cape, Clanwilliam district, Cedarberg mountains at Algeria, alt. 1 000 m, *Buckerveld* (BOL, holo.); flowered at Kirstenbosch 75/26.

Petamenes buckerveldii (L. Bol.) N.E. Br. in Trans. R. Soc. S. Afr. **20** : 276 (1932).

Corm small, c. 1,5 cm in diam. *Prophylls* 3, up to 15 cm long, reddish. *Leaves* 5–6, long sheathing, with the sheaths compact, closely ribbed, lamina up to 60 cm long and 1,5–3 cm wide; upper leaves bract-like, about 12 cm long. *Spike* simple, up to 60 cm long, bearing about 30 patent second, closely arranged flowers. *Bracts* patent, linear, acute to acuminate, 9–3 cm long, semi-amplexicaul and forming a narrow tube. *Flowers* irregular, long-tubed, 5–6,5 cm long, greenish yellow or cream with a small central purple spot on the lower lobes; perianth tube about 4 cm long, narrow, gradually widened to only 6 mm in diam. at throat; lobes very unequal and short, the dorsal central lobe oblong to obovate, 2,2 cm long and 1,2 cm wide, the upper laterals ovate-acuminate, 1,6 cm long, the lower ovate-acuminate 8–9 mm long. *Stamens* as long as the dorsal upper lobe; anthers 1,1 cm long. *Capsule* herbaceous, 2,3 cm long and about 9 mm in diam.; seeds broadly winged, 1 cm in diam.

So far recorded only twice from a locality in the Cedarberg, where it is found hanging down from the banks of mountain streams at 1 000 m altitude flowering in January.

CAPE.—Clanwilliam: Cedarberg, mountains at Algeria, alt. 1 000 m, *Buckerveld*; flowered at Kirstenbosch (BOL); between Algeria Forest Station and Middelberg, *Jackson* s.n. (BOL).

A very unusual *Gladiolus* but not very attractive. Dr Peter Goldblatt suggested its inclusion in this genus and we agree for there are several sound reasons, namely the winged seeds, the tubular perianth tube which is not abruptly widened into an upper cylindrical part as in *Homoglossum* nor is there any indication of a pouch. The lobes, although small and unequal, arise from one plane at the top of the tube. The cream or pale greenish colour of the flower and the maculae on the lower lobes suggest some affinity with *G. angustus* L. Its habitat is similar to that of *G. cardinalis* which accounts for the resemblance vegetatively to this species.

30. ***Gladiolus angustus*** L., Sp. Pl. **1** : 37 (1753) et ed. 2, **1** : 53 (1763); Mill., Ic. 95 t.142 f.2 (1757); Burm. f., Prod. 2 (1768); Houtt., Nat. Hist. **II**, **12** : 50 (1780); Lam., Encyc. **2** : 726 (1786); Ait., Hort. Kew. **1** : 65 (1789); Jacq., Coll. **4** : 154 (1792), Ic. t.252 (1795); Lam., Illustr. **1** : 116 (1791); Willd., Sp. Pl. **1** : 218 (1798) excl. syn.; Ker. in Curtis's bot. Mag. t.602 (1802), Irid. Gen. 141 (1827) excl. syn.; Pers., Syn. **1** : 45 (1805); Vahl, Enum. **2** : 103 (1806) excl. syn.; Andr. Bot. Rep. t.589 (1809); Red., Lil. t.344 (1813); Spreng., Syst. Veg. **1** : 151 (1825); Bak. Handb. Irid. 204 (1892), Fl. Cap. **6** : 140 (1896) excl. syn.; Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893) excl. syn.; L. Bolus, Barclay & Steer, Second Bk S. Afr. Flrs t.160, 162 (1936); Lewis in Adamson & Salter, Fl. Cape Penins. 260 (1950). Type: Cape (LINN 59.16, holo.); the corms, received from the Cape, flowered in the Hartencamp, George Clifford's garden near Leiden, Holland.

G. angustifolius Salisb. Prod. 40 (1796), nom. illeg. *G. telifer* Stokes Bot. Comment. **1** : 217 (1830) nom illeg.

Pre-Linnaean:

Gladiolus africanus folio gramineo, floribus carneis maculum rhomboideum purpureum inscriptis uno versu positus. Boerh., Lugdb. **2**: 127 (1727).

Gladiolus foliis linearibus. L., hort. Cliff. 20, sp. 2, t.6 (1738).

Gladiolus caule simplicissimo foliis linearibus floribus alternis. Van Royen, Prod. Leyd. 19, sp. 2 (1740).

Gladiolus foliis linearibus floribus distantibus corollarum tubo limbis longiore. Mill. Ic. 95, t.142 f.2 (1760).

Common name: Long-tubed Painted Lady.

Corm small, globose, 0.8–1.5 cm diam., occasionally up to 2 cm, with fine more or less membranous dark or reddish brown tunics; roots long, branched, with a spongy covering. *Stem* slender, flexuose, usually simple, 20–75 cm high, average 25–50 cm, with 2–3 basal sheaths, the 1 or 2 outer 1–4 cm long, membranous, obtuse, colourless or partly brown; inner up to 12 cm long, acute, reddish brown or purplish. *Leaves* 3–5, the lowest with a fairly long sheath and linear or linear-lanceolate blade 15–75 cm long, 3–8 mm wide, moderately firm with the midrib slightly prominent; others shorter, the uppermost 5–15 cm long. *Spike* fairly lax, secund, 2–10-flowered (rarely 1), usually 3–6. *Bract* lanceolate or oblong-lanceolate, acuminate or acute, 3–8 cm long, usually 3–4 cm; bracteole distinctly shorter than bract, oblong, acute or obscurely bidentate. *Flowers* long-tubed, funnel-form, white, cream or dark creamy-yellow, sometimes flushed with pink, the 3 lower lobes with a conspicuous dark red or purplish red rhomboidal or spade-shaped mark at or above the middle. *Perianth tube* 4–7 cm long, straight or very slightly curved, slender, widening gradually upwards and funnel-shaped at the top; *lobes* obtuse or acute, the dorsal hooded, oblong or broadly elliptic, 2.5–3.5 cm long, 1.3–2 cm wide, upper laterals usually slightly smaller, varying from elliptic to ovate-oblong or ovate-lanceolate, and 3 lower subequal, more or less elliptic, 1.8–2.8 cm long, 0.5–1 cm wide. *Stamens* arcuate, arising about 1 cm below top of tube, usually reaching middle of dorsal lobe; filaments 1.8–2.2 cm long; anthers linear, subsagittate, 0.6–1 cm long. *Ovary* oblong or ellipsoid, 6–8 mm long; style reaching top of anthers, with spatulate conduplicate branches 6–7 mm long.

Found in and around the Cape Peninsula, extending north westwards as far as Clanwilliam and eastwards to Bredasdorp; occasional in moist or marshy places on flats and near streams on mountain slopes, flowering from October to January.

CAPE.—Bellville: Flats off Klipfontein road near Bellville, *Thomas* (NBG); Sarepta, *Acoccks* 1038, 2249 (S). Bredasdorp: between Elim and Agulhas, *Marloth* 10007 (PRE, STE). Cape Peninsula: sand dunes near Cape Town, *Žeyher* 1631 (G, K, P, S); Table Mt., *Paphe* (SAM), *Schinz* (Z); Devil's Peak, *MacOwan* HAA 946 (BM, BOL, G, K, SAM, UPS); near Cape Town, *MacOwan* 2947 (BR); near Claremont, *Dümmer* 670 (CGE); near Constantia, *Ecklon* 322 (S); Constantiaberg, *Compton* 20372 (NBG); near Princess Vlei, *MacOwan* HAA 1973 (G, K, SAM, Z); Chapmans Bay, *Lewis* 474 (SAM); Noordhoek, *Peers* in herb. Marloth 13648 (PRE); Cape Point Reserve, *Taylor* (NBG). Clanwilliam: Elands Kloof, *Compton* 16766 (BOL, NBG), *Lewis* 834 (SAM); Cedarberg, kloof leading to Slangvlei, *Taylor* 1849 (NBG); Middelberg, *Compton* 12707 (NBG); Cedarberg, between Donkershoekkop and Sneeuwberg, *Stokoe* (SAM 56171); Cedarberg, Boskloof, *Esterhuysen* 7597 (BOL, SAM); Cedarberg,

TAB. 11



GLADIOLUS foliis linearibus. *Hort. Cliff.* p. 20. [p. 2.]

a. Bulbus.

b. Caulis.

c. Folium in sectionem caulis.

d. Corolla longitudinaliter dissecta.

e. Pistillum.

G. D. ENKAT del.

J. WANDELAAR fecit

FIG. 14. *G. angustus* L. hort. Cliff. (1738).



FIG. 15. *G. angustus* L. Specimen preserved in Van Royen's Herbarium, Leiden.

Photo: National Herbarium, Pretoria.

Tafelberg, *Esterhuysen* 18130 (BOL); Krom River Kloof, *Esterhuysen* 17971 (BOL). Hopefield: Hopefield—Saldanha Bay road, *Bachmann* 1690 (Z). Tulbagh: Tulbaghskloof, *Ecklon & Zeyher* (BR, L). Wynberg: Flats W. of Mowbray, Vygieskraal road, above farm, *Dod* 1979 (BOL, K); near Vygieskraal Farm, *Dod* 362 (BM, BOL, K), *Pillans* (BOL, 14857); Strandfontein, *Salter* (BOL).

WITHOUT LOCALITY: *Bergius* (S); *Brehm* (BR); herb. *Burman* (G); *Ecklon & Zeyher* 155 (G); herb. *Gronovius* (BM); *Harvey* 901 (K); herb. *Linnaeus* (LINN, sheet 59.16); herb. *Loddiges* (S); *Krauss* (G); *Retzius* (LD); herb. *Schneevoogt* (GRO); *Thunberg* (S); *Verreaux* (G); herb. *Van Royen* (L, no. 904, 137–244); *Persoon* (L); herb. *Willdenow* 920, 938 (B).

The history of this species dates back to 1738 when an excellent illustration of a plant cultivated in Holland by George Clifford was published by Linnaeus in his *Hortus Cliffortianus*. (See fig. 14.) The binomial system of nomenclature not being in use at that time it appeared as '*Gladiolus foliis linearibus*', but in 1753 Linnaeus named it *G. angustus* in the first edition of his *Species Plantarum*. There is a good specimen in his herbarium, which is taken to be the type, and another in Van Royen's collection in the Leiden Rijksherbarium (sheet no. 904, 137–244) which matches the plant illustrated in 1738 (see fig. 15). It was already listed by Boerhaave in 1727 in his catalogue of the Leiden Hortus.

Apart from two illegitimate names, one given by Salisbury in 1796 and the other by Stokes in 1830, there has been no real confusion in the nomenclature of this species, which is well distinguished by its long, slender and almost straight perianth tube and short lobes. In the typical form it shows a comparatively large conspicuous red mark on each of the three lower lobes. These are commonly broadly rhomboidal or somewhat spade-shaped and situated well above the middle of the lobes but there is a certain amount of variation in the shape and size of the lobes and a form with longer and more acute lobes has the marking near the middle. In the Clanwilliam district there is a distinct form with paler flowers, a much narrower rhomboidal marking in the middle of the lobes, and smaller anthers, only about 6 mm long instead of the usual 8–10 mm.

The species shows a close relationship with *G. carneus* and *G. undulatus* accentuating the plasticity of the perianth; the tube may lengthen as happened in this species or the limb may enlarge as in *G. undulatus*, *G. carneus* striking a balance between tube and limb.

31. ***G. carneus*** Delaroche, Pl. Nov. Descr. No. 3, t.4 (1766); Burm., Prod. Fl. Cap. 2 (1768); Hoult., Nat. Hist. II, 12 : 53 (1780); Jacq., Ic. t.255 (1795), Coll. Suppl. 21 (1796). Gmelin, Syst. Nat. 8, III (1788–93; 1796); Red. Lil. t.65 (1808). Thunb. Fl. Cape. ed Schult. 41 (1823). Barnard & Goldblatt in Jl S. Afr. Bot. 36 : 311 (1970). Type: Cape, t.4 of Delaroche's work.

G. trimaculatus Lam., Encycl. 2 : 727 (1786), III. 1 : 116, t.32 f.3 (1791); Ker, Irid. Gen. 141 (1827); Roem. & Schult., Syst. Veg. 1 : 413 (1829). Type: Cape, *Sonnerat* (P, holo.). *G. ventricosus* Lam., Encycl. 2 : 727 (1786). Type: Cape, *Sonnerat* (P, holo.). *G. blandus* Ait., Hort. Kew. 1 : 64 (1789); Andr., Bot. Rep. 2, t.99 (1800); Ker in Curtis's bot. Mag. t.625 (1803), Irid. Gen. 140 (1827); Bak. in Fl. Cap. 6 : 154 (1896); Hamer, Wild Flowers of the

Cape 19, t.3, 2 (1926); L. Bolus, Barclay & Steer's Second Bk of S. Afr. Flrs 153 (1936); Kidd, Wild Flowers of the Cape Peninsula t.73, 2 (1950); Lewis in Adamson & Salter, Fl. Cape Penins. 260 (1950); Rice & Compton, Wild Flrs of Cape of Good Hope t.203 (1951). Type: Cape, *Masson* (BM, holo., flowering stem only, no leaves).—var. *purpureo-albescens* Ker in Curtis's bot. Mag. t.645 (1803). Type var.: ex hort. Curtis's bot. Mag. t.645.—var. *niveus laccato-emarcescens* Ker, Curtis's bot. Mag. t.648 (1803). Type var.: ex hort., Curtis's bot. Mag. t.648—var. *d* Ker, Curtis's bot. Mag. t. 1665 (1814); subsequently given the name var. *excelsus* Ker in Bot. Reg. 7, under notes at end (1821); Gen. Irid. 140 (1827); Bak. in Syst. Irid. 175 (1877), Handb. Irid. 217 (1892), Fl. Cap. **6** : 155 (1896).—var. *carneus* (Delaroché) Ker, Irid. Gen. 140 (1827), Bak. in Fl. Cap. **6** : 155 (1896). Type var.: t.4 of Delaroché's work.—var. *albidus* (Jacq.) Ker, Irid. Gen. 140 (1827). Type var.: Jacq. Ic. t.256.—var. *campanulatus* (Andr.) Ker, Irid. Gen. 140 (1827). Type var.: Andr. Rep. t.188.—var. *hibbertii* Bak., Handb. Irid. 217 (1892, Fl. Cap. **6** : 155 (1896). Type var.: no type mentioned, described as a pink variety with red marks on lower segments. *G. albidus* Jacq., Ic. 2 t.256 (1795), Coll. Suppl. 21 (1796). Type: Ic. t.256. *G. cordatus* Thunb., Prodr. 185 (1800); Fl. Cap. ed. Schult. 44 (1823). Type: Cape, without precise locality, *Thunberg* 1017 (UPS, holo.). *G. campanulatus* Andr., Bot. Rep. t.188 (1801). Type: Bot. Rep. t.188. *G. expallescens* Schrank in Denkschr. Bot. Ges. Regensb. **2** : 210 (1822). Type: ex hort. (BR, holo.). *G. pictus* Sweet, Hort. Brit. ed. **1** : 397 (1827). Type: Curtis's bot. Mag. t.1665, ex hort. Herbert; corms received from Holland; no specimen preserved. *G. excelsus* (Ker) Sweet, Hort. Brit. ed. **2** : 501 (1830). Type: as for *G. pictus* (= *G. blandus* var. *d excelsus*). *G. dubius* Eckl., Top. Verz. 41 (1827) nom. nud. Based on: Cape, ex Hort. Ludwig, 1.11.1826 (S). *G. lemonia* Pourr. ex Steud., Nom. ed. **2**, **1** : 686 (1840) nom. nud. *G. tenuis* Bak. in J. Bot., Lond. **14** : 335 (1876), J. Linn. Soc. **16** : 174 (1877); Handb. Irid. (1892), Fl. Cap. **6** : 145 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 225 (1893); non Bieber 1808. Type: Cape, Swellendam, Langeberge, Craggy Peak, *Burchell* 7303 (K, holo.). *G. lunulatus* Klatt in Abhand. Naturf. Ges. Halle **12** : 342 (1882) et Ergän. 8; Dur. & Schinz, Consp. Fl. Afr. **5** : 219 (1893). Type: Curtis's bot. Mag. t.645 (= *G. blandus* var. *purpureo-albescens* Ker). *G. macowanianus* Klatt in Trans. S. Afr. phil. Soc. **3** : 199 (1885); Lewis in Adamson & Salter, Fl. Cape Penins. 259 (1950), Rice & Compton, Wild Flrs Cape of Good Hope t.202 (1951). Type: Cape Peninsula, slopes behind Hout Bay, *MacOwan* 2065 (SAM, holo.; sheets distributed as 2605). *G. vinulus* Klatt in Trans. S. Afr. phil. Soc. **3** : 199 (1885); Dur. & Schinz, Consp. Fl. Afr. **5** : 226 (1893). Type: Cape, near Wynberg, *MacOwan* 2651, HNAA 287 (SAM, holo., B, BM, G, K, P, S, UPS). Klatt omitted to cite any collection but the type is evidently *MacOwan* 2651. *G. cuspidatus* Jacq. var. *β ventricosus* (Lam.) Bak., Handb. Irid. 205 (1892), Fl. Cap. **6** : 140 (1896). Type: as for *G. ventricosus* Lam. *G. pappei* Bak. in Handb. Irid. 208 (1892), Fl. Cap. **6** : 146 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 222 (1893). Lewis in Adamson &



FIG. 16. *G. maculatus* Sweet (left) and *G. carneus* Delaroche; Breynius, *Icones Rariorum* 2, t.7 (1739).

Photo: By courtesy of Prof. H. B. Rycroft.

Salter, Fl. Cape Penins. 259 (1950). Rice & Compton, Wild Flrs Cape of Good Hope t.205 f.1 (1951). Type: Cape, summit of Table Mountain, *Pappe* s.n. (K, hol., SAM). *G. prismatosiphon* Schltr in Bot. Jahrb. **27** : 102 (1900); Type: Cape, Bredasdorp mountains near Napier, *Schlechter* 9656 (B, hol., BM, BOL, K, Z). *G. callistus* Bol. f. in Ann. Bolus Herb. **2** : 105 (1917). Type: Cape, Worcester district, Orchard Siding, *Dicey* sub NBG 1217/13 (BOL 14844, hol., PRE);—var. *gracilior* Bol. f. l.c. Type var.: Cape, Bredasdorp district, Ratel River, *Bolus* 8693 (BOL, hol., PRE). *G. eximius* Ingram in Gard. Chron. ser. 3, 89 : 46, with fig. (1931). Type: Cape, Caledon district, Palmiet River mouth area, *Ingram* s.n. (K, flower only). *G. crispulatus* L. Bol. in Ann. Bolus Herb. **3** : 182 (1924); Rendle in Curtis's bot. Mag. t.8923 (1938). Type: Cape, Riversdale, foot of Langeberge, *Muir* 810 (BOL, hol.). [*G. tabularis* Eckl., Top. Verz. 38 (1827) is a nomen nudum and was believed to be a synonym of *G. monticola*. The type however (*Ecklon* s.n., 24.1.1824; S) from Table Mountain proved it to be a depauperate specimen of *G. carneus*.]

Pre Linnaean: *Gladiolus floribus patentibus externe carneus interne candidis, stella maculisque purpureis insignitis, lacinia suprema maxima*. Breynius, Ic. rar. 2, t.7 f.2 (1739). (See fig. 16.)

Common names: Painted Lady, White Afrikaner, Bergpypie, Christmas Painted Lady.

Plants very variable in size and number of leaves produced, 20–100 cm tall, often flowering in the juvenile stage. *Corm* globose, 2–3 cm in diam., covered by tunics which resemble thin wood curls and break up into soft, thin fibres with age; occasionally with sessile cormlets. Basal sheaths 2–3, variable in size. *Leaves* up to 5, very variable in size and shape, ensiform to linear, up to 60 cm long and 2 cm broad, usually about half as long and broad, fewer, shorter and narrower in young and stunted plants; the basal leaf usually the largest, sheathing only near the base; upper progressively smaller, thinly coriaceous, glabrous or rarely minutely puberulous below, midrib distinct. *Spike* (1) 3–8(12)-flowered, occasionally branched, erect or leaning, distichous with the flowers laxly arranged. *Bract* free from the rhachis, erecto-patent, boat-shaped, (3) 4–6(8) cm long, green, often suffused with brown; bracteole smaller. *Flowers* up to 8 cm long, widely funnel-shaped, in one population somewhat campanulate, white, cream, pink or mauve, with or without markings on 3 lower lobes and/or with dark suffused blotches in the throat, rarely immaculate, soft in texture; *perianth tube* enveloped by bract and bracteole, slender, tubular, curved, widened towards the throat, 2–4 cm long; *limb* about as long as the tube or shorter, spreading to somewhat campanulate, the 3 upper somewhat to distinctly larger than the lower, ovate-acute to ovate-acuminate, dorsal sometimes slightly hooded and at times up to twice as broad as the laterals; lower lobes with red, purple or yellow, cordate, hastate or V-shaped markings, or these reduced to a pair of spots or rarely marks wanting; in one eastern race with rows of blotches in the throat and occasionally with longitudinal

papillate ridges. *Stamens* arcuate, arising just below the throat and placed across the mouth of the perianth, anthers purple; style just overtopping anthers. *Capsule* ellipsoid, stramineous, *c.* 2 cm long; seeds pale yellowish brown, oblong-orbicular, broadly winged, *c.* 7×5 mm.

Widely distributed in the winter-rainfall region of the Cape from the Cape Peninsula to Ceres in the west and to Riversdale in the east. Fairly frequent on mountain slopes in fertile habitats, in sandy soil or in marshy areas, from sea-level to 1 200 m altitude, flowering from September to January. After a good rainy season and after veld fires the plants are seen to flower in masses in certain areas.

COLOUR PLATE 9. FAY ANDERSON.—Corm; inflorescence.

Cape.—Cape Peninsula: Kirstenbosch, indigenous (NBG 88586). October 1968.

The species still appears to be in a state of flux and hybridizes easily with other species. In the eastern districts around Caledon and Bredasdorp it very probably crosses with *G. floribundus*, for some specimens appear to be intermediate. It clearly shows the unstable characters prevalent in the subfamily *Ixiodeae*, in the variability of the tube-length and tapering of the lobes of the perianth. Some specimens grade into *G. angustus* L., whereas others are difficult to separate from *G. undulatus*. It will flower in the juvenile stage and may remain in this stage permanently due to habitat, such as marshy and/or cold areas or at high altitudes which inhibit further development.

No markings are shown on the lower lobes of the flowers of Delaroche's plate, the iconotype, but these may also be absent in wild plant populations (*vide* Acocks 3338 (S) from near Stellenbosch and others).

In the annotated copy of Delaroche's thesis sent to Linnaeus by Van Royen he added a note to say that he did not know the species and that the author was not satisfied with the illustration. There is a sheet in the Van Royen Herbarium in Leiden (No. 904, 136/555) which bears the name *G. carneus* in his handwriting, but as he did not know the species in 1766 it cannot be regarded as a type. In the Thunberg Herbarium sheet 1013 (UPS) named *G. carneus* Delaroche agrees with the typical form found for instance in Kirstenbosch and near Hout Bay. His sheet 1017 is the type of *G. cordatus* Thunb. In the Linnaean Herbarium sheet 59.17, bearing the epithet *angustus*, represents *G. carneus*. Sheet 59.29 was named *G. carneus* by Linnaeus the younger and shows the form described as *G. pappei* Bak. Sheet 59.31 represents the typical form. A very early illustration is the one which appeared in Breynius's *Icon. rar.* t.7 f.2 (1739), a rather crude picture of this species (fig. 16). It is not quoted by Burman although he cited most of Breynius's figures.

At the beginning of the nineteenth century the species had received a number of different names. Lamarck in Paris, who had received material from Sonnerat from one of his visits to the Cape and Table Mountain, named it *G. trimaculatus* and *G. ventricosus*. Aiton at Kew described material which Masson had collected, as *G. blandus*, a name under which it has been known





for all these years. Thunberg named some of his Cape specimens *G. cordatus* and Jacquin, probably a Boos and Scholl collection, *G. albidus*. Kcr reduced a few of these taxa to varieties of *G. blandus* Ait. and Baker subsequently reduced several to synonymy under the closely related species *G. angustus* L. and *G. undulatus* L. (syn. *G. cuspidatus* Jacq.).

G. macowanianus Klatt was upheld by Lewis in the *Flora of the Cape Peninsula* because of its wide upper perianth lobe. This character however varies and no other differences are linked with it. She also kept *G. pappei* Bak. as a separate species, but when dealing with the taxon *G. carneus* throughout its range one realizes that *G. pappei* is a form of this species.

In *G. carneus* however several races can be recognized; many of these received specific rank. Although some could be given subspecific rank, too little is known at present of this variable complex to be able to define all the different forms. Some will be briefly discussed here. Typical plants which are well developed, bearing several broad leaves and many-flowered spikes are found around the Cape Peninsula and Stellenbosch. The perianth is widely funnel-shaped and more or less regular, up to 8 cm long. In the low-lying areas in the neighbourhood of the Palmiet River mouth a fewer-leaved, smaller form occurs in which the lower lobes assume a somewhat spoon-shaped stance with the upper protruding forwards above them.

From the swamps on the top of Table Mountain '*G. pappei*' Bak. has been described. In this ecotype the number and the size of the leaves is reduced and fewer flowers are brought forth.

Another race is found further east on the Langeberg mountain range around Napier and Swellendam and extending further east as far as Riversdale. The oldest name for this taxon is *G. tenuis* Bak. (a homonym), and it was described from two Burchell collections from Craggy Peak near Swellendam. It is the same as *G. prismatosiphon* Schltr. which was collected near Napier by Rudolf Schlechter and his younger brother Max on a journey from Elim to Caledon and Genadendal in December 1896. Characteristic of this race is the normally 4-6-flowered, second spike with fairly small (c. 4-5 cm long) flowers and the bracts short, obtuse and gaping, exposing the slender curved tube. However, 1- or 2-flowered individuals with acuminate bracts also occur in this area and these approach the taxon *G. crispulatus* L. Bol. with its crispulate lobes and distinct spotting on the lower lobes near the throat. In the flower painted for *Curtis's Botanical Magazine*, t.8923 a narrowly scabridulous stripe is present on the lower lobes beside the double row of spotting, but this was not observed on the type specimen.

FIG. 17. From a painting by J. G. Lewis.—Inflorescence; corm; longitudinal section of flower; bract and bracteole.

Cape.—Cape Peninsula, Table Mt. *Lewis* 681 (SAM). December 1939.

CAPE.—Bredasdorp: Baardskeerdersbos, *Van Breda* 1058 (PRE). Pearly Beach (Hagel Kraal), swamp behind dunes, *Acocks* 22783 (PRE). Caledon: Voelgat, *Schlechter* 9540 (PRE, etc.), Houhoek, *Schlechter* 9377 (PRE, etc.), Betty's Bay, *Robyns* 4443 (BR); Kleinmond, *Van Breda* 1454 (K); near mouth of



FIG. 17. *G. carneus* (*G. pappei* Bak.).

Palmiet River, marsh, *Salter* 5176 (K); Swartberg near Caledon, *Galpin* 4718 (K, PRE). Cape Peninsula, Table Mountain, near Waterfall, *Moyle Rogers* (K); Devil's Peak, *Bolus* 3736 (BOL), *Wolley Dod* 399 (BOL), *Waaivlei*, *Dod* 2182 (K), Orange Kloof, *Salter* 9492 (BM), near Constantia, *Ecklon* 322, 324 (PRE), Hout Bay, *Marloth* 286 (PRE); Olifantsbos, Cape of Good Hope Nature Reserve, *Taylor* 7239 (STE); swamp patches above Window Gorge, *Esterhuysen* 12297 (BOL, PRE); between Smitswinkel Bay and Cirkels Vlei, *Galpin* 12285 (PRE). Heidelberg: Tradouwsberg Forest Reserve, above Grootvadersbos, *Taylor* 149 (NBG); Goedehoopberg, *Thorne* (SAM 44549). Montagu: Tradouw Pass, 16 km above Andries Uys Bridge, *Marsh* 843 (PRE, STE). Riversdale. Langeberg, slopes above Witte Els, *Muir* 810 (BM, BOL); foot of Langeberg, *Muir* s.n. (K); Kampsche Berg on Langeberg, *Burchell* 7069 (K), *Rourke* 307 (NBG); Langeberg, near Riversdale, *Schlechter* 1913 (BOL, Z); Corente River Farm, *Muir* in herb. *Galpin* 5369 (BOL, GRA, PRE). Stellenbosch: lower N. slopes of Bottellary Hills, towards Koelenhof, *Acocbs* 3338 (S); farm Uitkyk, *Verdoorn* s.n. (PRE); Jonkershoek, *Garside* 276, 1662 (K), *Marloth* 1823 (PRE); Banghoek Kloof, *Esterhuysen* 19898 (BOL, PRE); Sir Lowry's Pass, *Schlechter* 5360 (BM, G, K, P, Z). Swellendam: Langeberge near Heidelberg, *Esterhuysen* 18256 (BOL, PRE); Craggy Peak on Langeberge, near Swellendam, *Burchell* 7303 (K—type of *G. tenuis*), 7421 (K); Swellendam Mt., *Stafford Smith* (BOL); mountain above town, *Taylor* 4232 (NBG); Eleven o'Clock Mt., *Wurts* 108 (NBG); Langeberg, *Brown* (NBG); Swellendam Mts, *Cameron* sub *Marloth* 11859 (PRE). Tulbagh: Mostertberg, *Bolus* 5255 (BM, K, Z). Worcester: Botha's Halt, along irrigation furrows, sandy soil, *Van Breda* 899 (PRE); Breede River bridge near Brandvlei, *Walters* (NBG); between Breede River and Bokkeveld, *Drège* 8426c (P); Du Toit's Kloof, *Drège* 8426b (K), *Acocbs* 20634 (K, PRE); Dutoits Peak, *Marloth* 2499 (PRE); Bokkeveld, *Marloth* 8483 (PRE); French Hoek, *Grey* (K), *Marloth* 8108 (PRE); Baviaanskloof off Bain's Kloof, *Linley* (SAM); Sneekop, *Marloth* 1824 (PRE); Onklaarberg 32 km S. of Worcester, *Stokoe* 170 (PRE).

WITHOUT LOCALITY: *Sonnerat* (P); *Verreaux* (G, P); *Roxburgh* (BM, G); *Niwen* (BM); *Oldenburg* 75 (BM); *Bowie* 31 (BM); *Sparman* (S); *Mund* (CGE); *Thom* (K); *Harvey* 899, 918 (K), *Pappe* 75 (K); *Zeyher* 3980 (K); *Jameson* (K), herb. *Loddiges* (S).

The Painted Lady was one of the first Cape species of *Gladiolus* to be cultivated in Europe and later America and used for crossing with other species, producing some attractive hybrids. William Herbert, well known for his work on bulbs, which he cultivated in his garden in Spofforth, England, was one of the first to cross this species with several others. In 1819 he wrote in a letter to the London Horticultural Society (*Trans. Hort. Soc. Lond* 4 : 44 (1822)):

‘On the Production of Hybrid Vegetables: Of Gladioli I possess the following mules; *G. blando-cardinalis*, *G. cardinalis-blandus*, *G. angustoblandus*, *G. tristiblandus*, etc. These mules flower most beautifully in the open border in a mixture of sand and peat.’

In later years breeders lost interest in these hybrids when they were overshadowed by crosses of *G. natalensis* and *G. oppositiflorus*.

32. *Gladiolus floribundus* Jacq., Coll. 4 : 162 (1790) et Ic. 2, t.254 (1795).
Type: Jacquin, Ic. 2, t.254.

Corm ovoid, 1.5–4.5 cm diam., with tunics of fine pale brown fibres extending up in a neck 3–9 cm long, often thick and matted, sometimes wanting and only the inner pale submembranous tunics present; often producing 1–2-several short to long stolons bearing pointed cormlets 1–2 cm long. *Stem* fairly sturdy, simple or branched, 15–55 cm long, average 20–35 cm, usually more or less declinate or flexuose above the middle; with 1 or 2 subacute basal sheaths, the outer hyaline, 2–6.5 cm long and inner up to 10–15 cm, usually brown or irregularly banded or mottled with red or purple above the middle. *Leaves* normally 5–7, the 2–4 basal 12–40 cm long, with fairly short sheaths sometimes more or less mottled with red or purple, and linear-lanceolate to ensiform blades

0.4–1.7 cm wide, erect or subfalcate, usually firm, several veined and somewhat striate with the margins and midrib slightly prominent, or softer and grass-like with fewer and less conspicuous veins; lower cauline-like basal and 1–2 upper much shorter, the uppermost often subarcuate and bract-like. *Spike* secund or subdistichous, 2–14-flowered, occasionally only 1, the flowers more or less porrect or often arranged in an arching spray on the curved rhachis. *Bract* lanceolate, oblong or ovate, acuminate, acute or subobtuse, convolute, 6–3 cm long, usually at right angles to the rhachis, closely wrapped around the perianth tube; bracteole shorter than bract, subacute or minutely bidentate. *Flowers* variable in size, shape and colour, funnel-form 4–10 cm long, with a short curved to long and fairly straight tube and semi-erect or patent, equal or unequal lobes; closing at night, occasionally scented; colour varying from white or cream to pink, salmon pink or mauve, variously flushed with pink or mauve outside, the lobes with a pink, red, wine, maroon or purplish medial line and sometimes with small purplish marks in throat; in ssp. *rudis* with hastate marks on lower lateral lobes. *Perianth tube* cylindrical below, widening gradually, funnel-shaped above, more or less curved, darker than limb; *lobes* longer or shorter than tube, the 3 lower similar or smaller than 3 upper, narrowly oblong to obovate, 2–5 cm long, obtuse or shortly acute and apiculate above, margin sometimes undulate or crisped. *Stamens* arcuate, placed against dorsal lobe or rarely symmetrically arranged around the style, inserted in upper half of tube, usually only reaching to the middle of the dorsal lobe, anthers purple to black, linear, subsagittate, 5–8 mm long. *Capsule* oblongo-ellipsoid, 2.5–4 cm long, thin-walled; *seeds* oblong to sub-orbicular, 1–1.3 cm long, yellow-brown, broadly winged.

The species has a widespread distribution in the winter-rainfall area of the Cape, from Clanwilliam in the west to Port Elizabeth in the east, fairly common among limestone rocks on flats and hills near the coast, on Table Mountain sandstone slopes and in hard clay and gravel soil on hills and rocky mountain slopes up to 1200 m in semi-karroid areas; flowering from September to November.

Five subspecies are recognized.

KEY TO SUBSPECIES

Perianth without hastate marks on lower lobes, with a dark median stripe:

Perianth lobes unequal, the lower usually much smaller, perianth white,

cream, pale pink or mauve (a) ssp. *floribundus*

Perianth lobes more or less equal:

Perianth lobes smooth:

Perianth salmon pink; inhabiting limestone areas around Cape Agulhas (b) ssp. *miniatus*

Perianth pale cream or pale yellow, firm in texture (c) ssp. *milleri*

Perianth lobes crinkly (d) ssp. *fasciatus*

Perianth with the lower lateral lobes bearing hastate marks (e) ssp. *rudis*

(a) ssp. **floribundus**

G. floribundus Jacq., Coll. 4 : 162 (1792) et Ic. 2, t.254 (1795); Willd., Sp. Pl. 1 : 219 (1798); Vahl, Enum. 2 : 112 (1806). Type: Jacquin, Ic. 2, t.254.

G. undulatus sensu Jacq., Coll. **3** : 256 (1789) et Ic. t.251 (1790); Willd. Sp. Pl. **1** : 218 (1798); Vahl, Enum. **2** : 102, pro parte, exclud. *G. undulatus* L. & Thunb.; Spreng., Syst. **1** : 153 (1825); Bak., Handb. Irid. 218 (1892), Fl. Cap. **6** : 155 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 226 (1893); Ker, Curtis's bot. Mag. t.647 (1803), Irid. Gen. 142 (1827), var. *a*; non L. (1767). Type: Jacquin, Ic. t.251. *G. striatus* Andr., Bot. Rep. t.111 (1800); non Jacq. (1786-93). *G. floribundus* var. *striatus* Pers., Syn. **1** : 45 (1805). Type: Bot. Rep. t.111. *G. grandiflorus* Andr., Bot. Rep. t.118 (1800). Type: Bot. Rep. t.118. *G. vittatus* Zucc. in Roem., Coll. 121 (1806), Roem. & Schult., Syst. **1** : 427 (1817). Type: not located. *G. geardii* L. Bol. in Ann. Bolus Herb. **4** : 28 (1925). Type: Cape, Steytleville district, farm Hadley near Steytleville, comm. Paterson NBG 135/23 (BOL, holo., K). Described from a specimen which flowered at Kirstenbosch. —var. *uitenhagensis* L. Bol. in *S. Afr. Gdng & Ctry Life* **24** : 100-101 (1934). Type: Cape, Uitenhage district, Kamaehs, *Harcourt-Wood* (BOL 21319, holo., K). Flowered at Kirstenbosch. *G. bowkeri* Lewis in Jl S. Afr. Bot. **7** : 29 (1941). Type: Capc, Somerset East district, Somerset, *Bowker* (K, holo., PRE, photo). *G. graminifolius* (Bak.) Lewis in Jl S. Afr. Bot. **7** : 26 (1941). Type: Cape, Riversdale, plains between Swellendam and Gouritz River, *Bowie* 7 (BM, holo.).

Antholyza spicata Mill., Gard. Dict. ed. 8, No. 2 (1768) et Ic. t.40 (1755) sine nom. *Montbretia pauciflora* Bak. in J. Bot., Lond. **14** : 336 (1876). Type: as for *G. bowkeri* Lewis.

Acidanthera pauciflora (Bak.) Benth., Gen. Pl. **3** : 706 (1883); Bak., Handb. Irid. 187, Fl. Cap. **6** : 132. Type: as for *G. bowkeri* Lewis. *A. graminifolia* Bak. in J. Bot., Lond. **14** : 338, Handb. Irid. 186, Fl. Cap. **6** : 130. Type: as for *G. graminifolius*. *A. forsythiana* Bak., Handb. Irid. 186, Fl. Cap. **6** : 131. Type: without locality. *Forsyth* (K, holo.).

In the more common and widespread forms which occur from the Clanwilliam to the Knysna districts the three lower lobes of the perianth arc usually considerably smaller than the three upper but from Knysna eastwards the difference becomes slightly less marked and in some plants from the eastern limits of the subspecies the lower lobes arc occasionally nearly as long as the upper. However Lewis, after examining a large number of plants, both living and dried, found that even in those from the same area there was a great deal of variation in the size of the plant, the number and size of the flowers and relative length of the upper and lower perianth lobes, and came to the conclusion that the various forms could not be separated.

CAPE.—Alexandria: Skietrug, *Archibald* 5337 (PRE, GRA); Bushmans Poort, *Marais* 544 (GRA), Bathurst: Port Alfred, *Hutton* 602 (Z) s.n. (GRA); between Rietfontein and the coast, *Burchell* 4081 (K); Fish River Lighthouse, *Hill* 2249 (RUH). Bredasdorp: De Hoop, *Martin* 1191 (NBG); 13 km W. of Bredasdorp on Elim road, *Lewis* 6112 (NBG). Caledon: Bot River, *Van Breda* 1447 (K, PRE); S. foot of Riviersonderend Mts, near Sonderend, *Esterhuysen* 23792 (BOL, K); Riviersonderend Mts, *Zeyher* 3981 (SAM); ditto, Appels Kraal, *Stokoe* (SAM 59761). Ceres: Ceres Karoo, 'Spes Bona', *Marloth* 13141 (PRE). Clanwilliam: Matjiesrivier, Cedarberg, *Wagener* 280 (NBG). George: Great Brak River, *Schlechter* 5760 (BOL, GRA, Z); Brak River, *Penther* 765 (K, S, Z), 771 (Z); Lange Kloof, *Prior* (K). Heidelberg: 13 km N.E. of Port Beaufort, *Lewis* 6111 (NBG); 8 km from Malagas on road

to Witsands, *Lewis* 6201 (NBG). Humansdorp: kloof near Ferreira Town, Gamtoos, *Hutchinson* 1471 (K); Clarkson, *Penther* 558 (S, Z), *Schlechter* 6004 (BM, BOL, G, K, Z); flats N. of Slang River, *Fourcade* 1888 (BOL, K). Knysna: Belvedere, *Rehmann* 466 (Z). Ladismith: top of Rooiberg Pass, *Acocks* 20765 (PRE, K); Elandsberg (= Torenberg), Klein Swartberg, *Wurts* 1188 (NBG); ridge S. of Zoar, *Wurts* 1591 (NBG). Laingsburg: Fisantekraal Valley, *Compton* 21171 (NBG); Cabidu, *Barker* 6772 (NBG); Witteberge, near Matjiesfontein, *Marloth* 1141 (PRE). Montagu: Kogmans Kloof, *Esterhuysen* 23887 (BOL). Mossel Bay: Robinson Pass, *Rogers* 4269 (PRE). Oudtshoorn: Swartberg Pass, *Hutchinson* 1153 (BOL, PRE, K); Meiringspoort, *Esterhuysen* 24881 (BOL); Oudtshoorn, *Deas* 3 (PRE). Port Elizabeth: Van Staden's River Mts, *Ecklon & Zeyher* 288 (G, S); Van Staden's River, *Bolus* 1633 (K), *MacOwan* 2062 (K), *Long* 1136 (K); near Port Elizabeth, *West* 65 (K), *Cory* sub BOL 20311 (BOL, K), *Long* 1359 (PRE), *Kemsley* sub GRA 1084/143 (GRA, SAM), *E.S.C.A. Herb.* no. 66 (Z); Humewood, *Holland* 3502 (BOL), *Barnard* (NBG); Walmer, *Paterson* 245 (GRA, BOL); Parsons Vlei, *Long* 828 (PRE); Theescombe, *Long* 1105 (PRE). Riversdale: near Sandkraal, *Muir* 3839 (PRE, BOL); near Still Bay, *Lewis* 6109 (NBG), *Thomas* (NBG); Gouritz River, bei der Mündung des Flusses und am Vischbaai, *Drège* (S); plains between Swellendam and Gouritz River, *Bowie* 7 (BM—type of *Acidanthera graminifolia*); Fisheries, *Acocks* 21560 (PRE); Karoo N. of Garcia Pass, *Marloth* 12587 (PRE). Robertson: Robertson, *Marloth* 7748 (PRE). Somerset East: Somerset, *Bowker* (K—type of *Acidanthera pauciflora* and *Gladiolus boukeri*). Swellendam: Potberg, *Richmond* 38 (NBG), *Barker* 8447 (NBG), *Taylor* 4333 (PRE), 4338 (NBG); Stormsvleikloof, *Leipoldt* 3588 (PRE, BOL); near Bonnievale, *Dymond* (BOL), *Marloth* 8617, 11813 (PRE). Uitenhage: Uitenhage, *Pappe* (K); near Uitenhage, *Burchell* 4261 (K); near Soutpanshoogte, *Pappe* (SAM). Uniondale: Laudina, *Esterhuysen* 6504 (BOL), *Fourcade* 5450 (BOL). Worcester: Triangle, *Compton* 3836 (BOL); Prospect Peak, Hex River Mts, *Esterhuysen* 15894 (BOL, PRE, K); Hex River valley, near De Doorns, *Bolus* 13198 (BM, BOL, K, GRA, PRE); Chavonnesberg, lower slopes, *Esterhuysen* 14565 (BOL, NBG); Smousbos, *Barker* 6809 (NBG); hills near Brandvlei, *Barker* 9526 (NBG), *Lewis* 6192 (NBG); Hex River Valley Mts, *Tyson* 797 (SAM), *Archer* 684 (SAM); Bonteberg, Eikebos, *Esterhuysen* 3780 (BOL). Touws River, *Schimper* (Z).

WITHOUT LOCALITY: *Forsyth* (K—type of *Acidanthera forsythiana*); *Bowie* 32 (BM); *Thom* (K); herb. *Van Royen* (C); *Sparrman* (S, UPS); herb. *Willdenow* 931, 939 (B); *Ekeberg* (S); *Pappe* (S); *Zeyher* 1631 (S); herb. *Retzius* (LD); *Thunberg* (S, UPS—sheet 1088 in herb. Thunb.); *Zeyher* 85 (LD); *Verreaux* (G); *Prior* (K); *Drège* 2426 b (G).

Jacquin figured two forms in his *Icones* vol. 2, the first of which, t.251 (1790), he identified with *G. undulatus* L. and the second, t.254 (1793–4), he described as new and named *G. floribundus*. Since then the species has generally been known as *G. undulatus* Jacq., while the earlier *G. undulatus* of Linnaeus was relegated to a synonym of *G. cuspidatus* Jacq.

The erroneous treatment of *G. undulatus* L. was pointed out by Ker in 1801 but unfortunately was not rectified by him. Under t.538 in *Curtis's Botanical Magazine*, an illustration of a plant which he considered to be a variety of Jacquin's *G. undulatus* (see *G. fasciatus*), he wrote as follows: 'This is not the *G. undulatus* of Linnaeus, as anyone may be satisfied who will attend to the observations on this and *G. recurvus* in the *Mantissa*. . . . However, as it has been already three times figured, and is known to botanists in general by the present title, which agrees well enough with it, as does the name *cuspidatus* with the real *undulatus*, we retain it, as most likely to prevent confusion. . . .'

A few months later, under t.578 and again under t.582 in the same work, Ker expressed regret at not having restored Linnaeus's specific name to the species to which it was given by him, and it is indeed unfortunate that he failed to make the correction at that time for it must now be done in order to comply with the modern rules of botanical nomenclature. Since there can be little doubt that Jacquin's Ic. t.251 and t.254 represent two forms of the same species, the name *G. floribundus* Jacq. is retained for the one described above and *G. undulatus* L. (not of Jacquin) restored to the species which for so long has been known as *G. cuspidatus*.

On examining the types of *Acidanthera pauciflora*, *A. graminifolia* and *A. forsythiana* it was found that they are all forms of *G. floribundus* and these names are accordingly cited above in the synonymy, as well as the new name *G. bowkeri*, which Lewis proposed for *Acidanthera pauciflora* in 1941, and the new combination *Gladiolus graminifolius*.

The species does very well in cultivation and was figured in various botanical and gardening books during the second half of the eighteenth and early nineteenth centuries.

(b) ssp. **miniatus** (Eckl.) Oberm. stat. nov.

G. miniatus Eckl., Top. Verz. 40 (1827). Type: Without precise locality, Ecklon 323 (S, lecto.).

This attractive but not very common subspecies is distinguished by its salmon pink flowers in which the upper half of the tube is distinctly tubular instead of funnel-shaped, with the stamens arising much lower in the tube and having much longer filaments. In colour, size and shape the flowers look more like those of *Watsonia* than *Gladiolus*. It is found only in limestone at or near the coast in the southernmost parts of the continent, and does not do well in cultivation in any other type of soil. It flowers from October to November.

In the published description the locality of the type is given as between Hottentotshollandkloof and Houhoek but on a sheet of Ecklon 323 named *G. miniatus* in the Natural History Museum Herbarium in Stockholm there is a MS. description in which the words 'Vergleiche die im Nov. 25 bei Cap Agulhas am Strande gesammelte Pflanze' have been crossed out. This is a reference to the plant he named *G. aghullensis*, a nomen nudum, enumerated on the next page, p. 41, in his *Topographisches Verzeichniss*. The specimen so named is in the Stockholm Herbarium (PRE, photo). It is more than likely that this is the correct locality as the specimens are exactly the same as some in the Compton Herbarium collected near Cape Agulhas by Mrs M. Thomas, and it is not known from the area between the Hottentots-Holland Mts and Houhoek. It occurs near the coast a few kilometres to the south, and the form in this area, near Hawston and Onrus in the Caledon district, has slightly larger flowers with considerably broader lobes than the form from the Agulhas area, but the two are linked by intermediates.

As there is no known specimen of Ecklon's which can definitely be placed as the holotype, Ecklon 323 has been selected as the lectotype.

COLOUR PLATE 10. G. J. LEWIS.—Inflorescence; bract; bracteole; corm and base of leaves; longitudinal section of flower.

Cape.—Caledon: Between Hawston and Onrus, *Cloete* (NBG 62781). November 1953.

CAPE.—Bredasdorp: 3 km E. of Cape Agulhas, *Salter* 4107 (BM); Soetendal valley, *Ecklon* (LE); inland from Struis Bay, *Leipoldt* 3589 (PRE, BOL); between Agulhas and Bredasdorp, 16 km N. of Agulhas, *Thomas* (NBG). Caledon: between Hawston and Onrus, about 3 km E. of Hawston, *Cloete*

(SAM 62781, 67320); Onrus River, *Esterhuysen* (BOL, NBG); near Stanford, *De Villiers* sub NBG 807/47 (NBG); hills near Die Kelders, *Hafström & Acocks* 2072 (S, PKE). Riversdale: The Downs, near Riversdale, *Ferguson* (SAM). Without precise locality: *Ecklon* 323 (S); *Lehmann* (LE).

Although *G. miniatius* was named and briefly described by Ecklon in 1827 neither Klatt nor Baker referred to it in their works on *Gladiolus*. The only authors who did not entirely ignore it were Durand & Schinz, who cited it as a synonym of *G. albidus* Jacq. in their *Conspectus Florae Africae* (vol. 5, p. 212, 1893), but this is a misidentification as it is entirely different from that plant.

(c) ssp. **milleri** (Ker) Oberm., stat. nov.

G. milleri Ker in Curtis's bot. Mag. t.632 (1803) et Irid. Gen. 143 (1827), excl. syn.; Ait., Hort. Kew. ed. 2, 1 : 101 (1810); Roem. & Schult., Syst. 1 : 416 (1817); Spreng., Syst. 1 : 152 (1825); Bak. in J. Linn. Soc. 16 : 176 (1877), Handb. Irid. 218 (1892), Fl. Cap. 6 : 155 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 221 (1893) excl. syn. Batten & Bokelmann, Wild Flrs E. Cape Prov. t.33 f.8 (1966). Sine nom. Miller, Ic. 198, t.297 f.1 (1760). Type: Curtis's bot. Mag. t.632. *G. undulatus* sensu DC. in Red., Lil. t.122 (1805) excl. syn., non L. (1767). *G. scaphochlamys* Bak., Handb. Irid. 217, Fl. Cap. 6 : 153; Dur. & Schinz, Consp. Fl. Afr. 5 : 224. Type: Cape, Swellendam. dist., Sparrbos, near Buffelsjags River, *Drège* 8427 (K, holo., BM, G, L, P, S). *Geissorhiza grandis* Hook. f. in Curtis's bot. Mag. t.5877 (1870); Bak. in J. Linn. Soc. 16 : 95, Handb. Irid. 158, Fl. Cap. 6 : 75; Foster in Contr. Gray Herb. 135 : 73 (1941). Type: Curtis's bot. Mag. t.5877. Plants said to have been collected by *Wilson* but not located in Kew Herbarium.

This subspecies is characterized by the regular perianth which has a firm texture and is usually cream-coloured or pale yellow, flushed with pink or mauve outside and with a reddish or purple median line in lower half of lobes, sometimes darker and longer on lower than upper. Occasionally the 3 stamens revert to a symmetrical position around the style. The erect spikes are few-flowered and fairly lax.

It is found along the coast from Caledon to Port Elizabeth, occasional on flats, hills and foothills of mountains, usually in heavy clay or dark loamy soil, flowering from August to October.

FIG. 18. From a painting by G. J. Lewis.—Inflorescence; corm and leaves; flower laid out; bract and bracteole.

Cape.—Heidelberg; between Port Beaufort and Malagas, *Lewis* 5997 (NBG). September 1962.

CAPE.—Caledon: near Bot River, *Van Breda* 1447 (G). Heidelberg: Heidelberg, *Bayliss* 2303 (NBG); 21 km N.W. of Port Beaufort on Malagas road, *Lewis* 5997 (NBG). Humansdorp: 16 km W. of Humansdorp, *Lewis* 6160 (NBG); Clarkson—Humansdorp, *Penther* 722 (Z). Knysna: Leisure Island, *Esterhuysen* 13288 (BOL, NBG); near Forest Hall, the Crag, *Wurts* 2020 (NBG). Montagu: Koo, foot of Naudeberg, *Lewis* 6002 (NBG). Mossel Bay: Ruitersbos, *Van Niekerk* 78 (BOL). Port Elizabeth: Port Elizabeth, *Crewe* (K). *J.L. Drège* 103 (GRA, Z), *Long* 1105, 1359 (K), *E.S.C.A. Herb* 66 (G, K, WAG), 494 (G, Z), *Bokelmann* (NBG). Riversdale: Albertinia, *Loubser* 873 (NBG); 2 km S. of National Road to Gouritz River mouth, *Lewis* 6193 (NBG); Garcia's Pass, *Phillips* 389 (K); Muiskraal, near Garcia's



FIG. 18. *G. floribundus* subspecies *milleri*.

Pass, *Galpin* 4717 (GRA, K, PRE). Swellendam: Bonnievale, *Smith* (BOL), *Marloth* (PRE); 2–5 km E. of Swellendam, *Lewis* 6081 (NBG); near Voormansbos, *Pappe* (K); near Drew, *Marloth* 6476 (PRE); Riversonderend Mts, Stormsvlei and Breede River, *Zeyher* (P); Bontebok Park, Swellendam, *Liebenberg* 6518 (PRE); mountains near Puspasvlei, Voormansbos and Duiwelsbos, *Zeyher* 4081 (P, Z); Sparrbos, near Buffelsjags River, *Drège* 8427 (BM, G, K—type of *G. scaphochlamys*, L, P, S). Uniondale: hills near Avontuur, *Fourcade* 1647 (BOL, GRA, K, PRE, Z); Lauterwater, *Fourcade* 5027 (BOL).

WITHOUT LOCALITY: herb. Van Royen (C); *Thunberg* (UPS, sheet 1004 in herb., Thunb.).

There is no type specimen of *G. milleri* in the British Museum or Kew Herbarium so the plant figured in *Curtis's Botanical Magazine* must be regarded as the iconotype. Ker stated that there was a specimen of this species in the Banks Herbarium but, on examination, this plant (in the British Museum Herbarium), which was collected by Masson and is named *G. secundus* β , was found to match the type of *G. undulatus* L. so Ker's reference to it must be omitted.

The species was named in honour of the eighteenth-century English gardener, Phillip Miller, who illustrated a number of plants grown in the Chelsea Botanic Gardens in his *Icones* (1755–60), among them several South African species of *Gladiolus*. Ker cited t.40 of this work under *G. milleri*, which is here considered a subspecies of *G. floribundus* Jacq. (= *G. undulatus* Jacq., non L.). The ssp. *milleri* is closely allied to *G. floribundus* ssp. *floribundus*, as was noted by Ker, but differs in having a much more regular flower, with a shorter tube and the lobes more or less equal in length, the three lower only slightly narrower or sometimes as wide as the upper.

G. milleri Ker must have been grown in the Chelsea Gardens as it is almost certainly the plant described by Miller on p. 198 and figured on t.297 f.1, as *Gladiolus foliis ensiformibus floribus alternis, corollis patentibus*. This is evidently the plant Ker referred to under *G. undulatus* var. β in *Curtis's Botanical Magazine* t.538, which is the ssp. *fasciatus* Roem. & Schult. (He cited Mill., Ic. 198, t.292 f.2, but this is a mistake as t.292 is not a *Gladiolus* and f.2 on t.297 is a *Watsonia*.) Miller described the flower as divided into six equal parts and in the illustration it looks almost regular, with a fairly short tube and the lobes equal or the dorsal slightly longer than the other five, all of them patent above the middle. They are not conspicuously undulate as in ssp. *fasciatus* and the flower is too regular for ssp. *floribundus*.

In the Port Elizabeth area there is a form with completely regular flowers, the tube straight or almost so, lobes spreading equally from the middle and stamens symmetrically arranged around the style. Hooker f. placed this in the genus *Geissorhiza* and figured it in *Curtis's Botanical Magazine* in 1870 as *Geissorhiza grandis* (t.5877). In the *Flora Capensis* Baker retained it in *Geissorhiza*, with a comment that the plant 'approximates towards *Acidanthera*'. The material available was so scanty that Foster was unable to come to a decision about it when he revised *Geissorhiza* in 1941, and although he retained it in the genus he remarked that it almost certainly was not a *Geissorhiza*. Lewis was unable to trace the type (collected by Wilson) in Kew Herbarium, nor had it been seen by Foster, but she saw specimens from Port Elizabeth which exactly match the plant figured and consider that they represent a form of

ssp. *milleri*. A colour variation of this form was figured by Redouté in his *Liliacées* (t.122) in 1805, incorrectly named *Gladiolus undulatus* L. by De Candolle.

The type of *G. scaphochlamys* Baker has been examined and found to be the same as ssp. *milleri* so this name is also cited in the synonymy. Ker described the perianth tube of *G. milleri* as 'singularly solid, fleshy and somewhat brittle', and the flowers as scentless, but at least two collectors have recorded that they are fragrant and some plants with sweet-scented flowers have been collected and others, even in the same area, with no scent.

An incomplete specimen on sheet 1004 in Thunberg's Herbarium, collected between October and December and with the very vague locality 'Karoo', is almost certainly ssp. *milleri*. It was named *G. angustus* by Thunberg and identified as *G. vinulus* Klatt (which is a form of *G. carneus* Delaroche) by N. E. Brown, who stated in his paper on the South African *Iridaceae* in Thunberg's Herbarium that it was not *G. angustus* L., nor *G. fasciatus* Roem. & Schult. as named by Klatt.

(d) ssp. **fasciatus** (Roem. & Schult.) Oberm., stat. nov.

G. fasciatus Roem. & Schult., Syst. 1 : 429 (1817), nom. nov. for *G. vittatus* Hornem., Hort. Hafn. 2 : 950 (1815); Dur. & Schinz, Consp. Fl. Afr. 5 : 226 (1893) pro parte; non Zucc. 1806. Type: a cultivated plant said to have come from the Cape (C, holo.).

G. undulatus sensu Schneev., Ic. 19 (1792). *G. undulatus* sensu Jacq. var. β , Ker in Curtis's bot. Mag. t.538 (1801) et Irid. Gen. 142 (1827). non L. *G. socium* L. Bol. in J. Bot., Lond. 69 : 14 (1931). Type: Cape, George district, *De Mole* & *Kisch* ex hort. Arbuthnot (BOL 19083, holo, K).

The flowers of this subspecies are characterized by their crisped and undulate, more spreading lobes in an attractive delicate pink or pink and white; the dorsal lobe is also distinctly larger than the two upper laterals and the tube comparatively short and only occasionally exerted from the bracts. As a rule the flowers are arranged in an arching spray, with one or two side-branches.

It is recorded from the Mossel Bay and Riversdale districts, where it is locally frequent in sandy soil on flats and hills near the coast and occasional on mountain slopes. It flowers from September to October.

CAPE.—Mossel Bay: Mossel Bay, *Rogers* 4147 (BOL, PRE, GRA, Z), *Black* (BOL 14805); mountain behind the lighthouse, *Rust* (NBG). Riversdale: Still Bay area, *Thomas* (NBG); Blombos, *Lewis* 5619 (NBG); Ystervarkfontein, *Muir* 596 (BOL, SAM); Gouritz River mouth road, *Horrocks* 40 (NBG); The Fisheries, *Acocks* 21560 (K, NBG).

The type specimen in Copenhagen is a cultivated plant, briefly described as *G. vittatus* by Hornemann in 1815 and stated by him to have been introduced from the Cape of Good Hope in 1810 under that name, but with no reference to author or publication. *G. vittatus* Zucc. was published in 1806 but although no type specimen has been traced, it is almost certain that the plant described must have been a form of *G. floribundus* and the name is therefore cited in the synonymy under this subspecies. It is evident that Roemer & Schultes did not

consider *G. vittatus* Hornem. to be the same as *G. vittatus* Zucc. for they retained the latter and renamed the former *G. fasciatus* in 1817. Collections cited by Baker in the *Flora Capensis* under *G. vittatus* Hornem. are not this species but a form of *G. carneus*, and his description applies to them.

(*e*) ssp. **rudis** (Licht. ex Roem. & Schult.) Oberm., stat. nov.

G. rudis Licht. ex Roem. & Schult., Syst. **1** : 408 (1817); Spreng., Syst. **1** : 153 (1825); Ker, Irid. Gen. 146 (1827). Type: Cape, without locality or collector, Herb. Willdenow 917 (B, lecto., NBG, photo.). *G. hastatus* sensu Ker in Curtis's bot. Mag. t.1564 (1813); Geel in Sert. Bot. Cl. 3 (1832); Reichb., Fl. Exot. **1** : t.35 (1834); Klatt in Linnaea **32** : 712 (1863); non Thunb. 1800. *G. vomerulus* Ker, Irid. Gen. 142 (1827); Bak., Handb. Irid. 205 (1892), Fl. Cap. **6** : 142 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 226 (1893). Type: Curtis's bot. Mag. t.1564. *G. tigrinus* Eckl. ex Bak. in J. Linn. Soc. **16** : 173 (1877), nom. nud. Type: Cape, Caledon district, Swartberg, *Ecklon* 158 (BM, G, LD, PRE, S, SAM).

This subspecies has a white or pale pink perianth with a short funnel-shaped tube and a wide spreading limb; the lower segments bear a yellow cordate or hastate mark outlined with bright blue or purple but occasionally these marks are not so well developed. The 4–6 firm, striate, distichous leaves are usually transversely dark spotted at the base.

This subspecies is locally common in the Robertson district on the northern side of the Riviersonderend Mountains near McGregor; elsewhere it is found occasionally in the surrounding districts, its habitat being among bushes on stony lower slopes up to 1 000 m. It flowers from August to October.

CAPE.—Bredasdorp: Fairfield, *Lewis* 6084 (NBG); near De Dam, *Acocks* 22764, (PRE, NBG). Caledon: Caledon, *Žeyher* (K); Riviersonderend, *Žeyher* (K); Swartberg, *Ecklon* 158 (BM, G, LD, S, SAM, *G. tigrinus* Eckl. MS.), s.n. (BR, C, G, LD, P, PRE, Z); Swartberg, near Caledon, *Galpin* 4718 (PRE); Caledon Mts, *Marloth* 7081 (PRE); near Elgin, *L. Bolus* (BOL), *Linley* (SAM 58318); Palmiet River valley below Grabouw, *Andreae* 1056 (PRE); Wildepaardeberg, *Stokoe* (BOL); Hagedis Kloof, near Stanford, *Linley* (SAM 60881). Robertson: Boesmanskloof Pass, near McGregor, *Lewis* 6104 (NBG). Swellendam: below 10 o'clock Mt., *Wurts* 363 (NBG). Worcester: lower N. slopes of Jonas Kop (Langeberg), *Ryecraft* 2917 (NBG); Bosjesveld Mts, Worcester side, *Stokoe* (SAM 67843). WITHOUT LOCALITY: *Bowie* 30 (BM); herb. Willdenow no. 917 (B); *Žeyher* 3918, partly (S); *Ecklon* (L).

A description of *G. rudis* was published by Roemer & Schultes in 1817, from a plant with this name in MS. collected by Lichtenstein on his travels in South Africa between 1803 and 1806, recorded as coming from the foot of mountains in the Cold Bokkeveld region. The only specimen seen with this name is one in Willdenow's collection in the Berlin-Dahlem Herbarium, which is designated as the lectotype (fig. 19). It agrees with Roemer & Schultes' description and has the name *G. rudis*, and a brief description corresponding with Lichtenstein's short MS. description, attached to the sheet, but it is not certain whether it is the actual type. There is nothing on the sheet to indicate that it was collected by Lichtenstein and the only name there, in the bottom right-hand corner, is Hoffmannsegg.

In volume 38 of *Curtis's Botanical Magazine* of 1813 there is a very good



FIG. 19. Type of *G. rudis* Licht. ex R. & S.

Photo: By courtesy of Museo botanico Berolinensis.

illustration of this subspecies on t.1564, named *G. hastatus* by Ker, who gave it a new name in 1827, *G. vomerulus*, and stated in his *Iridearum Genera* where this was published, that the synonym *G. hastatus* Thunb. should be excluded from the description under *Curtis's Botanical Magazine* figure (the iconotype, as the specimen is not in the British Museum or Kew). In the same work he listed *G. rudis* Licht. ex Roem. & Schult. among the unknown species, so obviously did not recognize it from the description or associate it with *G. vomerulus*.

The Willdenow specimen was identified as *G. hastatus* Thunb. by Klatt, who presumably matched it with the plant figured under that name in *Curtis's Botanical Magazine* and was not aware that Ker had renamed it. There is no reference to *G. rudis* in Baker's works on the genus and the species is described as *G. vomerulus* Ker in the *Flora Capensis*, but after examining the specimen in the Willdenow Herbarium, and comparing an excellent photograph of it, kindly sent by the Director of the Berlin-Dahlem Herbarium, with *Curtis's Botanical Magazine* figure and material of *G. vomerulus* in the Bolus Herbarium and Compton Herbarium, Lewis was in no doubt that the two names applied to the same species, and *G. rudis*, being the earlier one, must be used for it. The epithet refers to the ladle-like marks on the lower lobes.

The Cold Bokkeveld locality is puzzling and is possibly a mistake as there are no other records from that area. It occurs further south, in the Worcester and other districts listed above, with the main centre of distribution probably on the northern side of the Riviersonderend Mountains in the Robertson district where it was found growing in large numbers in the spring of 1962. Under *G. vomerulus* in the *Flora Capensis* Baker cited *Ecklon* 158 with the locality 'eastern declivity of Table Mt.', but the species does not occur on the Cape Peninsula and the correct locality for *Ecklon* 158 is the Swartberg, near Caledon.

The subspecies *rudis* is allied to *G. carneus*, as noted by Ker, but is distinguished by its conspicuously mottled basal sheath, with the white spots often raised as if embossed, and a more open flower with the dorsal lobe not hooded, the three lower lobes not much smaller than the upper and the different more conspicuous marks on the lower side-lobes.

33. **Gladiolus undulatus** L., Mant. **1** : 27 (1767); Hoult., Nat. Hist. **2** : 12 : 59 (1780); Lam., Encyc. **2** : 724 (1786); Thunb., Prodr. 186 (1806), Fl. Cap. ed. Schult. : **51** (1823); non Jacq., nec Schneev. Type: LINN 59.11 *Gladiolus cuspidatus* Jacq., Ic. Pl. Rar. (fasc. 16) **2** : t.257 (1795); Coll. **5** : 17 (1797); Willd., Sp. Pl. **1** : 210 (1798); Andr., Bot. Rep. **3** : t.147 (1801) et var. **4** : t.219 (1802); Ker in Curtis's bot. Mag. t.582 (1802); Gen. Irid. : 139 (1827); Red., Lil. **I** : t.36 (1802); **3** : t.136 (1807); Ait., Hort. Kew. ed 2, **1** : 100 (1810); Bak., Handb. Irid. 205 (1892), Fl. Cap. **6** : 140 (1896) excl. var. β . L. Bolus, Barclay & Steer, Second Book of S. Afr. Flrs 154 (1925). Lewis in Adamson & Salter, Fl. Cape Penins. 260 (1950). Kidd, Wild Flrs

Cape Penins. t.89 (1950). Type: Cape, ex hort. Jacq. Ic. t.257. — var. *longiflorus* DC. in Red., Lil. 3, t.136 (1807). Type var. : t.136. — var. γ , *ensifolius* Bak. in Handb. Irid. 205 (1892). Type: Cape, Caledon, Houhoek, *Pappe* s.n. (K). *Gladiolus carneus* sensu Ker, Curtis's bot. Mag. t.591 (1801), non Delaroche. *Gladiolus affinis* Pers., Syn. 1 : 45 (1805). Type : Bot. Rep. t.219.

Corm ovoid, up to 3 cm in diam., covered by thin brown tunics soon becoming fibrous, often forming numerous reddish brown fairly large cormlets. *Height* 30–95 cm; base of stem with 2 short basal sheaths. *Leaves* about 5, variable in size and shape, short and ensiform to long and linear, 25–75 cm long, 5–20 mm broad, sheathing only near base, coriaceous, closely ribbed, ribs occasionally minutely pubescent below. *Spike* 4–9-flowered, occasionally with a short basal branch, erect, distichous with the flowers laxly arranged. *Bract* free from the rachis, erecto-patent, boat-shaped 3–6 cm long, green to brown; bracteole smaller. *Flowers* up to 10 cm long, with a long tube and campanulate limb, the lobes long tapered, greenish white, white, cream or pink, with dark pink or red markings on lower lobes, thin in texture; perianth tube very slender below, narrowly funnel-shaped above, 5–7 cm long, straight or slightly curved; lobes somewhat shorter than tube, ovate to lanceolate, with long tapering undulate tips, dorsal somewhat hooded, with upper half porrect, upper laterals patent, lower recurved, with distinct to faint markings, with a red-purple midrib sometimes distended to form a spade- or spear-shaped mark in the middle. *Stamens* arcuate, arising just below the throat and placed across the mouth of the perianth, anthers purple or yellow, 7 mm long; style just overtopping anthers, stigmas oblanceolate. *Capsule* not seen.

Rather rare in the south-western Cape, recorded from Clanwilliam to the Peninsula and eastwards as far as Caledon, on mountain slopes in damp fertile habitats, flowering October to January.

CAPE.—Caledon: Genadendal, *Roser* (PRE); Houhoek, *Pappe* (K, SAM), Hottentots-Holland, *Pappe*. Calvinia: Nieuwoudtville, bank of Oorlogs River, *McGregor* in herb. *Galpin* 10481 (PRE); Waterfall, Nieuwoudtville, *Barker* 9644 (NBG). Ceres: Cold Bokkeveld, 800–1 000 m. *Drège* (P). Clanwilliam: *Le Roux* (BOL 27908); *Pattison* 21471 (SAM); on the Olifants River and at Villa Brakfontein, *Ecklon & Zeyher* 160 (B†, C, G, LD, P, PRE, S); between Paleisheuvel and Leipoldville, *Werdermann & Oberdieck* 460 (B, PRE). Malmesbury: Perdeberg, *Pillans* 7792 (BOL). Paarl: Diep River, *Marloth* 7222, 7222a (PRE); Suurvlaakte (Hawequas Mountains) shallow kloof, *Esterhuysen* 12314 (BOL, PRE); Dutoitskloof, *Esterhuysen* 17765 (BOL, PRE), *Marloth* B6 (PRE). Peninsula: Bergvliet, *Purcell* 134, 135 (SAM); Kenilworth, *Bolus* 13727 (BOL); Kirstenbosch, *Barker* (NBG 63209), *Lewis* 5682 (NBG); Steenberg Plateau, in marsh, *Anderson* (NBG). Piketberg: top of Piketberg Mountain, *Pillans* 7486 (K, BOL); marsh, Verlorelei, *Pillans* 7800 (BOL). Somerset West: near Somerset West, *MacOwan* 2691 (PRE). Stellenbosch: Bottelary, *Verdoorn* s.n. (PRE), *Acocks* 1257 (S). Tulbagh: Tulbaghskloof (Nieuwekloof), Tulbaghstahl, at the foot of the Winterhoekberg, on the Witsenberg and at Voël valley, *Ecklon & Zeyher* (PRE); near Tulbagh Waterfall, *Pappe* (K).

WITHOUT LOCALITY: *Thunberg* (UPS, sheets a and d).

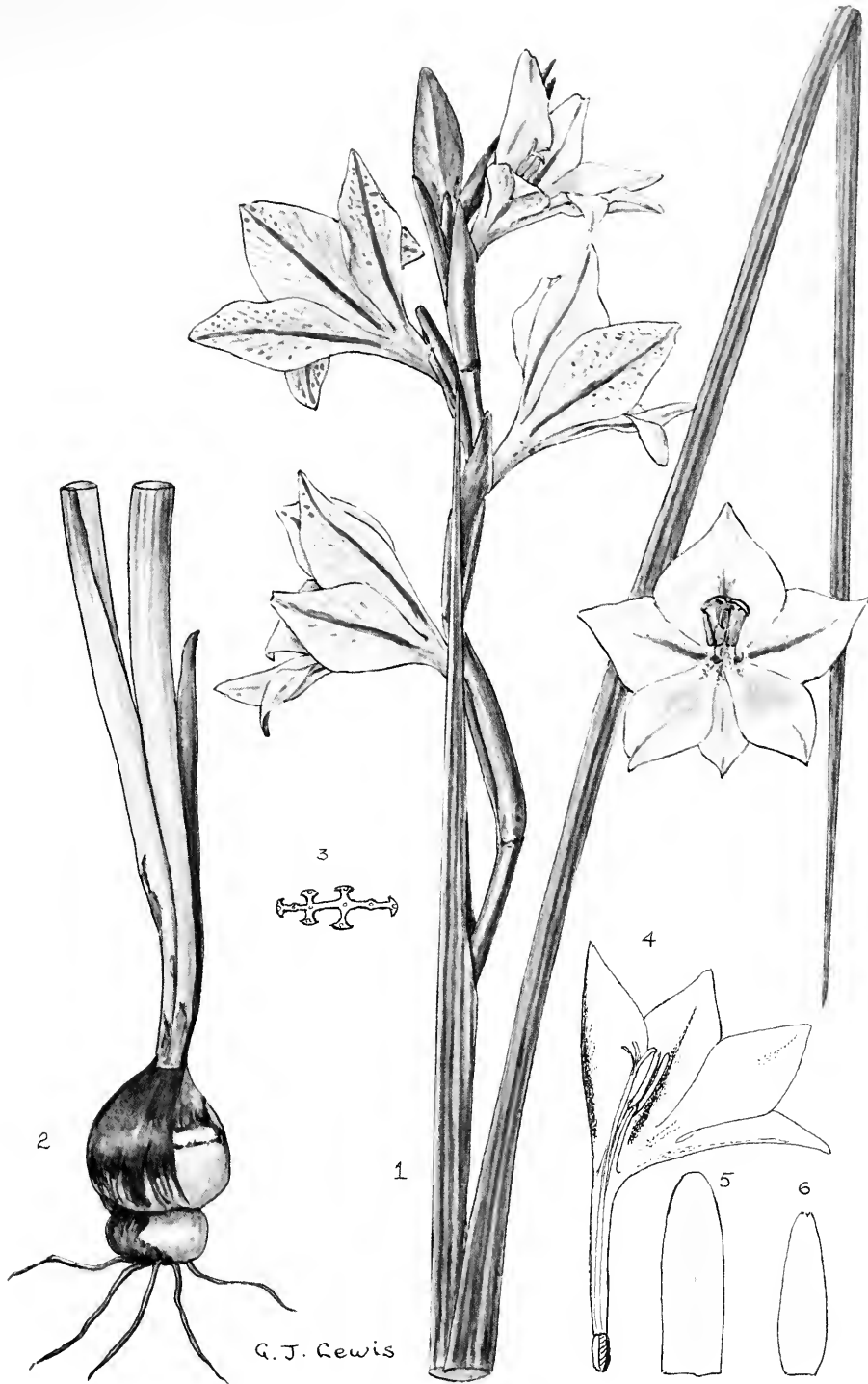
The type specimen was sent to Linnaeus by the Burmans in a collection of Cape and Indian duplicates in the summer of 1764. Linnaeus acknowledged the receipt of this collection in his letter to J. Burman (Hamarby 27 July 1764), in which he commented on two of the Cape specimens—the ‘Petasites’ which he proposed to make the type of a new genus (cf. LINN. 1063.1, ‘*Gunnera*

perpensa, No. 41') and 'Gladiolus tuus petalis undulatis' which he considered a very distinct species. He promised to send a full report on the collection but no such report has survived. After examining and describing the *Gladiolus*, Linnaeus concluded—possibly because the segments are subequal?—that the plant should be referred to *Ixia*. He has written *Ixia undulata* on the type sheet and never corrected this attribution. The species was however published three years later in Mant.1 as *Gladiolus undulatus*, with the comment that it was 'media Ixias inter et Gladiolos'. When the younger Linnaeus checked his father's Herbarium, he transferred *Ixia undulata* to *Gladiolus* as 'Gladiol. angustus'. Smith has written on the sheet 'Glad. undulatus Mant. ?' But there is no doubt that this specimen with Burman's snake fastener and Burman's No. 45 is the type. It was a duplicate; and the specimen which the Burmans retained is in their Herbarium (now at Geneva) labelled *Gladiolus undulatus* by N. L. Burman and it matches the Linnaean type.

The species was misunderstood by Jacquin who published in *Coll.* 3 : 256 (1790), the description of a *Gladiolus* under the Linnaean name of 'undulatus' which was quite distinct from Linnaeus's type and must be considered a taller form of the species Jacquin subsequently described in *Coll.* 4 : 162 (1792) as *Gladiolus floribundus* (see that species). In December 1792 Schneevooft published a plate of the pink, certainly very undulate, variety of *G. floribundus* var. *fasciatus* as *Gladiolus undulatus* quoting Linnaeus (but not Jacquin). Ten years later Ker published in *Curtis's Botanical Magazine* t.538 a plate of Schneevooft's plant as *Gladiolus undulatus* var. β , citing Jacquin's plant as var. d , though he was well aware that neither were Linnaeus's plant and that Linnaeus's name had priority. But he felt at the time that Jacquin's misinterpretation was so well established that it was inconvenient to restore Linnaeus's epithet. Jacquin had published in 1795 (see above synonymy) a plate of the pink-flushed form of *G. undulatus* L. under the name of *G. cuspidatus*. Ker confirmed this misidentification also in *Curtis's Botanical Magazine* t.582 (1802) where he adopted Jacquin's *G. cuspidatus* and quoted the earlier *G. undulatus* L. as a synonym, expressing his regrets that he had not restored Linnaeus's prior name in the first place. Jacquin's misinterpretations, thus confirmed by Ker, have persisted until the present day. It is now necessary to restore the name of *Gladiolus undulatus* L. to the species so long known as *G. cuspidatus* Jacq. and, as has been done, Jacquin's name of *G. floribundus* to the species so long known as *G. undulatus* Jacq.

Gladiolus undulatus can be distinguished from both the *Gladiolus carneus* and the *G. floribundus* complexes by the long narrow perianth tube and from *G. angustus* by the tapered undulate perianth lobes as long as or only slightly shorter than the tube and also by the usually distichous inflorescence. The species as here understood is found from the Cape Peninsula northwards to Vanrhynsdorp and eastwards to Caledon, flowering from October to December.

Burman's specimens are not localized. The Linnaean type matches the white- or cream-coloured form from the Cape Peninsula and probably came from there. This form is a robust plant up to 100 cm high with broad leaves, a



G. J. Lewis



Pl. 12.

G. scullyi

Species 37

usually branched stem and large thin-textured flowers of a greenish cream with a median stripe on the lower segments. It grows in damp places and along ditches and streams on the lower eastern slopes from Kirstenbosch to Muizenberg, and though much of its old haunts have been drained and developed it is still fairly common. Lewis in the *Flora of the Cape Peninsula* says, 'Rare, no recent collections'. Mrs Kidd (1950, t.89) is more correct when she remarks that it seldom flowers. The two populations at Kirstenbosch produce some flowers every year; but this Peninsula form which increases vegetatively by abundant cormels is undoubtedly a shy flowerer. An even more robust form with similar greenish white flowers occurs in the Clanwilliam district. Pattison sub SAM 21471 reports it as nearly 1.5 m high and there is in the Bolus Herbarium (*Le Roux* BOL. 27908) a specimen over 1 m high with five branches, two with short side branches bearing 65 flowers, some 15 of which were open when the spike was cut. This large white-flowered form was introduced to European gardens towards the end of the eighteenth century; it is illustrated by Andrews in *Botanist's Repository* 3, t.147 (1801), by Ker in *Curtis's Botanical Magazine* t.582 (1802) and by Redouté, Lil. 3 t.136 (1807) where De Candolle named it var. *longiflorus*. It is interesting to note that Andrews sub t.147 (which is the type of *G. affinis* Pers.) says, 'although this species is as old in our gardens as almost any we have, yet it is not much known from the unfrequency of its flowering of which there is no certainty'. The pink and pink-tinged forms of *Gladiolus undulatus* have usually smaller corms, narrower leaves and the tube is not so long nor are the segments so acuminate. This is the form illustrated by Jacquin as his type of *Gladiolus cuspidatus* and by Redouté, Lil. 1 t.36—De Candolle's *G. cuspidatus* var. *breviflorus*. A strikingly pink form was illustrated by Ker in *Curtis's Botanical Magazine* t.591 for which he erroneously revived Delaroché's name of '*carneus*'; considering it specifically distinct from the white-flowered form he had illustrated earlier and he well describes the differences between these particular forms. It appears also that these pink forms were much more regular flowerers in cultivation than the long-tubed white one. These pink forms occur mainly in the Worcester, Paarl and Stellenbosch districts and a population has been recorded also on the Steenberg plateau on the Cape Peninsula at a much higher altitude than the more robust white-flowered form.

Mrs Bolus, writing in the second *Book of South African Flowers* p. 155 (1936) sub. *G. cuspidatus*, remarks that future taxonomists may wish to divide the species as then understood. But the extreme forms as represented by the plants illustrated in *Curtis's Botanical Magazine* t.582 and t.591 are linked by intermediate gradations in colour, size and length of tube; as is the broad-leaved form which Baker distinguished as var. *ensifolius* and there seems no good reason to recognize any of these as worthy of even varietal rank.

The species has much the same distribution and flowering season as the closely related *G. carneus* and *G. angustus*. Some of the pink forms approximate closely to some of the forms of *G. carneus*, especially the form described as

G. pictus Sweet, and others with comparatively short perianth segments to *G. angustus*. The possibility of hybridization cannot be completely ruled out; but from the specimens examined, it seems that *G. undulatus* in all its forms is distinct and can be distinguished from its congeners.

Dr R. Vaughan (in a letter 27 May 1969) records it as a common weed in the sugar-cane fields on Mauritius. It has also become naturalized in Australia.

34. **Gladiolus caryophyllaceus** (Burm. f.) Poir. in Lam., Encyc. Suppl. **2** : 795 (1811); Lewis in Ann. S. Afr. Mus. **40** : 130 (1954). Type: a specimen from Houttuyn preserved in Burman's herbarium (G, lecto.).

Antholyza caryophyllacea Burm. f., Prodr. Fl. Cap. **1** (1768); Houtt., Nat. Hist. II, **12** : 63, t.79 f.3 (1780); Roem. & Schult., Syst. **1** : 448 (1817); Ker, Gen. Irid. 157 (1827); N.E. Br. in Kew Bull. **1929** : 130 (1929). *A. caryophyllaea* Panzer, Pflanzensyst. 11, 76 (1784); Vahl, Enum. **2** : 123 (1806). *Homoglossum caryophyllaceum* (Burm. f.) N.E. Br. in Trans. R. Soc. S. Afr. **20** : 279 (1932). *G. hirsutus* Jacq., Coll. **4** : 161 (1792) et Ic. t.250 (1795); Willd., Sp. Pl. **1** : 214 (1797); Vahl, Enum. **2** : 88 (1806); Red., Lil. t.273 (1809); Ait., Hort. Kew. ed. 2, **1** : 98 (1810); Roem. & Schult., Syst. Veg. **1** : 415 (1817); Spreng; Syst. **1** : 152 (1825), pro parte; Ker, Gen. Irid. 132 (1827); Eckl., Top. Verz. 40 (1827); Reichb. Fl. Exot. **1**, t.33 (1834); Klatt in Linnaea **32** : 713 (1863); Bak., Handb. Irid. 217 (1892), Fl. Cap. **6** : 153 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 218 (1893) excl. syn. *G. ambiguus* et *G. mucronatus*; Pole Evans, Flow. Pl. S. Afr. **6**, t.233 (1926); L. Bolus, Barclay & Steer, First Bk of S. Afr. Flrs t.145 (1928). Type: Jacq., Ic. t.250 (iconotype). —var. *roseus* (Andr.) Ker in Curtis's bot. Mag. t.574 (1802). *G. roseus* Andr., Bot. Rep. t.11 (1797). Type: t.11 (iconotype). *G. rubromarginatus* Schrad. ex Roem. & Schult., Syst. **1** : 415 (1817) nom. nud. *G. similis* Eckl., Top. Verz. 40 (1827) nom. nud. *G. hirtus* Steud., Nom. ed. 2, **1** : 686 (1840) in syn. sphalm. *Watsonia amoena* Pers. var. *rosea* (Andr.) Pers., Syn. **1** : 43 (1805).

Corm ovoid or subglobose, 1.5–3 cm diam., with pale or dark brown tunics of wiry vertical fibres connate above the middle, sometimes coarser and toothed below and sometimes in 2 or 3 imbricate layers. *Stem* usually moderately stout, straight or flexuose, rarely branched, varying in height from 18–30 cm in dwarf forms, up to 100 cm, but usually 50–75 cm, with 2 sheaths at the base, the outer 3.5–8 cm long, submembranous, obtuse, often brown at the apex and inner 5–15 cm long, obtuse or acute, the upper half green or brownish, often more or less pubescent. *Leaves* 4–6, normally the lowest about half as long as stem with $\frac{1}{4}$ – $\frac{1}{3}$ sheathing, striate and more or less pubescent and the blade ensiform, subfalcate or suberect, 1–2 cm wide, sparsely pilose near the base or sometimes glabrous with a few hairs on the ventral margins at the base, firm with narrow prominent cartilaginous margins—sometimes reddish—and the midrib and 1–5 other veins slightly raised; second similar but with a longer pubescent sheath and the blade usually shorter and slightly narrower, and upper 2–3 cauline half or more sheathing with short erect lanceolate

blades; in dwarf forms the leaves much shorter, the 2–3 lower patent, laxly spirally twisted and usually with more or less crenulate margins. *Spike* distichous or secund, somewhat laxly 2–8-flowered, rarely only 1. *Bract* lanceolate or oblong, acuminate or acute, 3–6 cm long (rarely up to 8 cm); bracteole slightly shorter than bract, minutely bidentate. *Flowers* fairly large, more or less campanulate or broadly funnel-shaped with the dorsal lobe slightly hooded and, tips of others patent, strongly scented, very pale to deep pink or pinkish mauve with a darker median line on the lobes outside and 3 lower variously spotted or streaked with pink or red. *Perianth tube* normally 3.5–5 cm long, curved near middle, subcylindrical below and funnel-shaped or occasionally subcylindrical above; *lobes* obovate, obovate-oblong or somewhat elliptical, obtuse or acute, the dorsal largest, 3–4 cm long, 1–2.5 cm wide, and others subequal, 2.5–3.5 cm long, 0.9–1.8 cm wide, the 3 lower connate for 5–7 mm at the base. *Stamens* arcuate, arising 1–1.3 cm below top of tube; filaments 2–2.3 cm long; anthers linear, subsagittate, 1.1–1.3 cm long. *Ovary* ellipsoid, 6–8 mm long; style reaching nearly to top of anthers or shortly above, with spatulate or obcordate-spatulate conduplicate branches 4–6 mm long.

Recorded from the south-western Cape, from around Malmesbury northwards as far as Vanrhynsdorp and Calvinia, occasional in sandy soil on flats, hills, and in valleys from sea-level to about 1 000 m alt., flowering from August to October.

CAPE.—Calvinia: Near Nieuwoudtville, *Leipoldt* 1053 (BOL), *Hardy* 85 (NBG), *Lewis* 5722 (NBG); 7 km W. of Nieuwoudtville, *Leistner* 410 (K, PRE); Tabaktuin, *Leipoldt* 785 (SAM). Clanwilliam: Nardouskloof, *Stokoe* (SAM 59765); Nardousberg, *Marloth* 8763 (PRE); Pakhuis Pass, *Esterhuysen* (NBG); Paleisheuvel, *Leighton*, in herb. Bolus 21503 (BOL, PRE); N. of Paleisheuvel, between Berg valley and Langevallei, *Acocis* 2934, 5537 (S); Olifants River valley, between Citrusdal and Clanwilliam, *Lewis* 5459 (NBG); Clanwilliam, *Marloth* 7467 (PRE); Olifants River Mts, *Phillips* 7514 (BOL, K, SAM); Elandsfontein, *Penther* 613 (S, Z). Hopefield: Portuguese Fontein, near Hopefield, *Melck* in herb. Bolus 12855 (BM, BOL, GRA, K, PRE, Z); near Hopefield, *Bachmann* 1116, 2128, 2130 (Z). Malmesbury: Groenkloof, *Ecklon & Zeyher* 156 (G, LD), s.n. (BR, C, L, LD, P, PRE, Z); near Groenkloof, *Ecklon* 962 (S), *Pappe* (BOL, SAM), *Zeyher* (C, K), *Bolus* 4342 (BOL, K), *MacOwan* HNAA 585 (BM, G, K, P, SAM) s.n. (Z); near Mamre, *Wasserfall* 873 (PRE); Riebeeck-Kasteel, *Stephens* (U). Piketberg: Het Kruis, *Rust* (NBG), *Stephens & Glover* 8620 (K); Piketberg, *Schlechter* 5791 (Z).

WITHOUT LOCALITY: herb. *Burman* (G); herb. *Houttuyn* (G, herb. *Burman*); *Pappe* (SAM); *Brehm*, herb. Schrank 587 (M); *Burchell* (K); *Auge* (BM); *Harvey* 906 (K); *Mund* (CGE); *Forsyth* (K, mixed with *Homoglossum merianellum*); *Ecklon* (OXF); hort. Kew 1789 (BM); *Talbot* (K); *Villett* (K); *Ecklon*, e hort. Ludwig (S—type of *G. similis*); *Ecklon* 22 (S, with locality Caledon dist. which is wrong); *Masson* 54 (C).

In 1929, after examining the South African *Iridaceae* in Burman's Herbarium, N. E. Brown wrote as follows about *Antholyza caryophyllacea*: 'I do not match this species at Kew. It is a true *Antholyza*, with entire (not bifid) style-arms, and it is not at all like *Watsonia humilis* Mill. to which Baker has referred it as a synonym. Burman's specimen is evidently the type of the figure in Houttuyn, *Handleid.* 12 : 63. t.79 f.3, as that excellent figure exactly represents Burman's specimen in every detail' (*Kew Bull.* 1929, p. 130). Three years later, in a revision of the various species which had been erroneously placed in *Antholyza* by different authors, Brown transferred this one to *Homoglossum*, as *H. caryophyllaceum*.

When Lewis examined Burman's *Iridaceae* in 1949 she found that the specimen named *Antholyza caryophyllacea* belonged to the species which had long been known in South Africa and elsewhere as *Gladiolus hirsutus* Jacq. Further investigation revealed that in 1811 Poiret had transferred *Antholyza caryophyllacea* to *Gladiolus*, and in a note published in the *Annals of the South African Museum* in 1954 she pointed out that the combination *Gladiolus caryophyllaceus* (Burm. f.) Poir. is correct and valid and should be used for the species. The rather cumbersome specific epithet obviously refers to the strong somewhat carnation-like scent, which at times can be overwhelming.

The specimen in Burman's Herbarium referred to by N. E. Brown is one of Houttuyn's and since it is the only one named *Antholyza caryophyllacea* it has been selected as the lectotype. When Houttuyn figured *A. caryophyllacea* Burm. f. in 1780 he mentioned that more than one specimen from the Cape had been brought to him so this might possibly be one of his duplicates.

Without examining living plants Burman would not have known about the scent and as he stated under his description that the species flowered in April 1760 it is presumed that he must have seen it then, but if one of those plants was preserved it does not appear to be in his collection now. The only other specimen of this species in Burman's Herbarium is inscribed by him: '*Gladiolus plicatus*. Gl. foliis ensiformibus nervosis, floribus spicatis alternis, tubo ac spatulis longioribus. C. B. S. 1759', but as the date is a year too early and both the generic and specific names are different, it is not at all likely that this could be his type. N. E. Brown remarked that he did not match this *Gladiolus* at Kew, and that the other specimens named *G. plicatus* by Burman f. belong to different species of *Babiana*, which is correct.

During the past twenty-five years this attractive species has become increasingly rare in the south-western districts of the Cape Province where it used to be so plentiful. To a small extent this may be due to overpicking but the main cause is the enormous agricultural development that has taken place, and the ploughing up of sandy flats and valleys in the areas where it once thrived. Although it is now threatened with extermination in South Africa it has become naturalized in Western Australia and covers acres of land north of Perth.

Generally known as *G. hirsutus*, it was one of the most popular species in cultivation in England and Europe during the eighteenth and nineteenth centuries, and like so many of the better known members of the family was given several different names, as can be seen above in the synonymy. No doubt the variability of the plant was partly the reason for some of the confusion in which it was involved. Writing of it in 1802 under an excellent illustration in the *Curtis's Botanical Magazine* (t.574) Ker remarked that 'it scarcely ever blows two years together of the same size and colour'. The same is true of the plants in their natural habitat; within a few yards they may vary in size from dwarf plants less than 30 cm high to tall ones up to one metre, the latter usually growing in bushes or more sheltered places, while the flowers vary considerably

in colour and the shape of the lobes. The pubescence on the leaves is also variable, the blades often being glabrous with only a few hairs on the sheath, and the perianth tube varies in shape and length from the more common form with the upper half broadly funnel-shaped, to a form in which it is subcylindrical and sometimes longer than average. The specimen named *Antholyza caryophyllacea* in Burman's Herbarium has the more or less cylindrical type of perianth tube, which is probably the reason why it was placed in *Antholyza* instead of *Gladiolus*.

35. **Gladiolus lewisiae** Oberm. in Flow. Pl. Afr. **40**, t.1596 (1970). Type: Cape, Ladismith district, Seven Weeks Poort, Aristata farm, Nissen (NBG 70597, hol., PRE, photo.).

Corm subglobose, about 2 cm diam., with thin submembranous dark brown tunics. *Stem* 45–52 cm high, sheathed by leaves nearly to base of spike, moderately slender, simple, flexuose near the top, with a single brownish obtuse sheath 6.5–7 cm long at the base. *Leaves* 3–4, firm, erect, with striate more or less hispidulous sheaths and sometimes a few minute scattered hairs on the blades, the 2 basal 50–68 cm long with the lower $\frac{1}{4}$ of the first and $\frac{1}{2}$ of the second sheathing, the blades lanceolate or linear-lanceolate, 6–9 mm wide, with prominent margins and 2–3 raised nerves; 1 or 2 upper leaves shorter with comparatively longer sheaths and linear or subulate blades. *Spike* subsecund, 4–7-flowered. *Bract* oblong, acute or obtuse, 2.8–5.5 cm long, 1–1.2 cm wide; bracteole oblong, 2.5–3 cm long, subobtuse or obtuse, sometimes minutely bidentate. *Flowers* fairly large, long-tubed campanulate, fragrant, creamy-white more or less flushed with deep pink outside, the 3 upper lobes with a cerise or crimson-lake median band and 3 lower with a narrow similar stripe in upper half, the lower half with a pale yellow patch and a spotted cerise median stripe at the base. *Perianth tube* 3.7–4 cm long, curved above the middle, the upper third funnel-shaped; *lobes* acute or subacute, the dorsal slightly hooded, porrect, broadly elliptic or somewhat obovate-elliptic, 3.2–3.7 cm long, 1.8–2.4 cm wide, the other 5 subequal, patent towards the apex, more or less elliptic, 2.5–3.6 cm long, the upper laterals 1.2–1.8 cm wide, the lower laterals 1.1–1.6 and lowest 1–1.3 cm wide, the 3 lower connate for 4–6 mm at the base. *Stamens* arcuate, arising 1.2–1.3 cm from top of tube; filaments 1–1.8 cm long; anthers yellow, linear, subsagittate, 1.1–1.2 cm long. *Ovary* ellipsoid, 6 mm long; style reaching to top or nearly to top of anthers, the branches 4–6 mm long, spatulate or oblanceolate, conduplicate. Flowering from September to October.

Only twice recorded from the Ladismith district, Cape, in the Seven Weeks Poort, at the foot of the Swartberg Mountains where it is rare on sandy flats.

CAPE.—Ladismith: Aristata Farm in Seven Weeks Poort, Nissen (NBG, 70597); Ladismith, Pillans 1086 (BOL).

Unfortunately very little is known of this attractive sweetly scented species of which there are only two records. The first, that of the late Mr N. S. Pillans, from Ladismith, flowered in his garden at Rosebank in 1907, and the second is from a small farm at the foot of the Swartberg Mts in Seven Weeks Poort. Two corms sent from there by Mrs F. E. Nissen flowered in the National Botanic Gardens, Kirstenbosch, in September 1963.

It is more or less intermediate between *G. tristis* and *G. caryophyllaceus*, more closely allied to the former, though in addition to the differences mentioned above the flowers are scented during the day and not only after sunset as in *G. tristis*. From *G. caryophyllaceus* it is distinguished by its much softer corm tunics which soon become torn and disintegrate, by its longer, comparatively narrower and more rigidly erect leaves, and the scent and colouring of the flowers. *G. tristis* is known to be fairly common at the northern end of Seven Weeks Poort but *G. caryophyllaceus* has a more westerly distribution and has not been recorded from anywhere near that locality so that there can be no possibility of *G. lewisiae* being a hybrid of those two species.

COLOUR PLATE 11. G. J. LEWIS.—1, inflorescence; 2, corm; 3, cross-section of leaf, $\times 2$; 4, longitudinal section of flower; 5, bract; 6, bracteole; and flower front view.

Cape.—Ladismith: Seven Weeks Poort type site, *Nissen* (NBG 70597), ex hort. Kirstenbosch. September 1963.

36. **Gladiolus involutus** Delaroché, Descr. Pl. Nov. 28, t.3 (1766); Burm. f., Fl. Cap. Prodr. **2** (1768); Houtt., Nat. Hist. II, **12** : 53 (1780); Roem. & Schult., Syst. **1** : 427 (1817); Spreng., Syst. **1** : 151 (1825); Ker, Irid. Gen. 142 (1827); Klatt in Linnæa **32** : 697 (1863) excl. syn. *G. thunbergii* Eckl.; Bak. in J. Linn. Soc. **16** : 174 (1877), non Handb. Irid. nec. Fl. Cap.; Dur & Schinz, Consp. Fl. Afr. **5** : 219 (1893) excl. ref. Bak., Handb., Fl. Cap. et *G. elatus* Balb. et *G. thunbergii* Eckl.; Bolus f. in Ann. Bolus Herb. **2** : 102 (1917). Type: herb. Van Royen (L, 904, 137–90, holo., PRE, photo), a plant which flowered in the nursery of Van Hazen in Leiden. (Fig. 20.)

G. bimaculatus Lam., Encyc. **2** : 727 (1786); Pers., Syn. **1** : 45 (1805); sine nom., Mill., Ic. 158, t.236 f.1 (1758). Type: Mill. Ic. t.236 f.1. *G. muirii* L. Bol. in Ann. Bolus Herb. **1** : 132 (1915). Type: Cape, Riversdale district, Tweekuilen, *Muir* 588 (BOL, holo., K, SAM).

Corm globose, 1.2–1.7 cm diam., with thin tunics of soft pale brown fibres; 1 or 2 short stolons with a terminal cormel sometimes present. *Stem* moderately slender, simple or branched, flexuose, 25–60 cm high, usually with 2 basal sheaths, the outer hyaline, obtuse, 2–7 cm long, inner slightly longer, acute, green or brownish. *Leaves* 6–7, suberect, linear, 2–6 mm wide, with slightly prominent margins and midrib, the 4 basal usually reaching from middle of stem to base of spike. *Spike* distichous, usually with several branches each

bearing 2–8, laxly-spaced flowers. *Bract* boat-shaped, lanceolate or oblong-lanceolate, acute to acuminate, 4–2,5 cm long, usually 3–2,5 cm; bracteole shorter than bract, acute or minutely bidentate. *Flowers* 3–4 cm long, somewhat funnel-shaped with the dorsal lobe hooded and 3 outer (viz. upper laterals and lower central lobe) distinctly longer than inner and spreading above the middle, pale pink or white with lower half of lower lobes yellow or pale greenish yellow edged with pink above, delicate in texture. *Perianth tube* curved, 1,4–1,8 cm long, very slender below and upper half funnel-shaped; *lobes* unequal, the upper laterals more or less ovate-lanceolate or with lower half ovate and upper somewhat abruptly narrowed to an acuminate tip, 2–3,4 cm long, 0,9–1,5 cm wide; dorsal elliptic or obovate-elliptic, acute, 1,5–2,7 cm long, 0,8–1,2 cm wide, distinctly shorter than upper laterals; 3 lower shortly unguiculate with claws 4–5 mm long, connate for about 3 mm, the lowest lanceolate, as long as upper laterals, 5–8 mm wide, and laterals narrowly elliptic, acute, 2–2,7 cm long (with claw), 3–5 mm wide. *Stamens* subarcuate, arising 4–5 mm below top of tube; filaments 1–1,3 cm long; anthers linear, subsagittate, 0,8–1 cm long. *Ovary* ellipsoid, 4–6 mm long; style nearly reaching top of anthers, with oblanceolate conduplicate branches 2–3 mm long. *Capsule* oblong or ellipsoid, thin-walled, pallid, 2–2,5 cm long; *seeds* broadly winged, oblong, dull brown, 6 mm long.

Recorded from the south-eastern Cape coastal region, from Swellendam to Port Elizabeth, where it is occasional on sandy flats or in gravel soil on flats and hills. Flowering from September to October.

CAPE.—Humansdorp: W. of Gamtoos River drift on road from Suurbbron, *Fourcade* 3998 (BOL, K); near Jeffreys Bay, *Hutchinson* 1455 (K); Klein River, Hankey, *Long* 1348 (K, PRE). Montagu: Scheepersrus, 32 km E. of Montagu, *Martley* (BOL). Port Elizabeth: Redhouse, *Paterson* 160 (BOL, GRA, K); near Port Elizabeth, *Ecklon & Zeyher* 689 (S). Riversdale: Tweekuil, *Muir* 588 (BOL, K, SAM—type of *G. muirii*, 1915); Oakdale, *Muir* 4119 (K); near Gouritz River, *Drège* (P); Gouritz River Bridge, *Story* 2882 (PRE); near mouth of Gouritz River, *Rust* (NBG); Riversdale, *Loubser* 980 (NBG); about 16 km S. of Riversdale, *Thomas* (NBG); Albertinia, *Hayes* (NBG). Swellendam: Barrydale, *Galpin* 4721 (K, GRA, PRE); road from Swellendam to Whitesands, *Wurts* 2191 (NBG). Uitenhage: Uitenhage, *Jordan* 78 (Z, GRA). Without locality: *Ecklon & Zeyher* 145 (LE, S); *Drège* 8429 (P); *Muir* sub BOL 15039 (BOL, J, G). Without collector: herb. Burman (G), herb. Gronovius (BM), herb. Ventenat (G), herb. Van Royen (L).

In the Rijksherbarium, Leiden, in the Van Royen collection a sheet No. 904, 137–90 labelled 'Royen apd Roche' represents contemporary material and is assumed to be the type. Preserved with it is a description drawn up by David van Royen on 17 August for the use of Delaroché (fig. 21). That the latter made use of it can be seen by comparing it with the printed text. It was published on 29 August 1766, which shows us how speedily these works were printed at that time. Van Royen sent an annotated copy of the thesis to Linnaeus and wrote 'ex viva planta' next to the description. This copy is now in the Linnaean library in London.

The species was in cultivation in England and Europe for many years and Miller figured it in 1758 without a binomial name: Lamarck then named it *G. bimaculatus*, basing his description on Miller's plate, but Poiret in Supplement 2 of the *Encyclopédie* (1812) noted that it was a synonym of *G. involutus*. With

FIG. 20. Type of *G. involutus* Delaroché.

Photo: National Herbarium, Pretoria.

Dr. (Gladolus) (involutus) caule paniculato, spicis distinctis.
^{Descriptionem feci ipse Aug. 1768 in amum d. La Roche.}
 Royen.

Gladolus foliis linearibus planis, spatha glabra auctiore
 Willd. icon. p. 157. tab. 266. f. 1.

*Gladolus caule ramoso, foliis linearibus, floribus cor,
 glabris La Roche*
 DELAROCHE.

*Rad. bulbis compressis, solidis involutis, lobata matris h,
 percrenentis.*

*Caulis scapus sesquipedalis, rectus, teres, glabres articulat,
 densis, paniculatus:*

*Folia radicalia ~~capitata~~ ex bulbi involucriis ~~capitata~~
 caulina ad scapi articulos, ~~capitata~~ vaginantis,
 linearia, patentia:*

*Inflorescentia procer terminalis, spicis distinctis, irregulari
 laciniis, variatur latibilibus involutis, Col. rosea,
 in antheris et laciniis lateralibus latu inferius
 purpureis.*

*Fructificatio: calyx, spatha vaga, bivalves, persistentes: valbe
 foliosa, carinata, appressantis, exsert.
 re majore, marginibus membranaceis,
 pelluculis:*

*Bract. monopetala renans, tubi tenuis, ar,
 ciliat, spatha brevior: limbus sampa,
 mutabilis bipartitus: ~~part~~ petala;
 laciniarum extremis revolutis:*

*Lacinia summa sub galea ovato-acuminata
 fornicata, staminibus imminens.*

*Lacinia lateralis duo longiores, marginibus
 latis connatis, totam floris faucem
 involventes.*

*Lacinia inferior tripartita, reflexum:
 lacinia media uncinata, longiore
 lateralibus linearibus obliquis.*

*Ham. filam. tra arcuata fauci inserta decurre,
 fra. anthera longa, graales, sagittata*

*pyst. germen inferum oblongum: stylus longitatis
 ne et st. filamentum, ~~stigma~~ trifidum
 laciniis clavatis.*

*peric. capsula oblonga, ventricosa, subtrigona,
 foliolaris, trivalvis.*

*Sem. plurima, benticularia, margine membranaceo
 cinerea.*

*Ob. Lint. numerum partium frequentissime in corolla, staminibus,
 et stigmatibus tripartitis.*

FIG. 21. Description drawn up by D. van Royen for the use of Delaroché
 17 August 1766.

Miller's and Delaroché's illustrations available it is difficult to understand how Baker could have confused this very distinct species with *G. rogersii* (syn. *G. bolusii* var. *burchellii*), as he did in the *Flora Capensis* where he described and cited plants of that species under *G. involutus*. Dr L. Bolus was not aware of his misidentification when she described *G. involutus* as a new species in 1915 and named it in honour of Dr J. Muir of Riversdale, who had collected it in that area. The mistake was rectified two years later by Bolus f. (viz. Frank Bolus, husband of Dr L. Bolus) in a note under his description of *G. bolusii* var. *burchellii* in the *Annals of the Bolus Herbarium*. Another species named *G. muirii* by Dr L. Bolus in 1924 is renamed *G. mutabilis* in this revision.

N. E. Brown observed in his paper on the *South African Iridaceae* of Burman's Herbarium that one of Burman's specimens named *G. involutus* was *G. linearis* (L.f.) N. E. Br. (a synonym of *G. quadrangulus*) and another was a species of *Gladiolus* which he could not name (*Kew Bulletin* 1929, 132), but when Lewis examined it in Geneva she recognized it as *G. involutus* Delaroché. Durand & Schinz in their *Conspectus Afr.* 5 : 219 (1893) cite as synonyms *G. elatus* Balb. (cf. *Species Incertae*, p. 297) and *G. thunbergii* Eckl., a nomen nudum, which is a synonym of *G. ornatus* Klatt.

Typical of the species is the freely branching, rather lax inflorescence and the boat-shaped long acuminate bracts which may attain nearly twice the length of the bracteoles. In the perianth the three outer lobes are distinctly longer than the inner ones and taper to a narrow tip from a comparatively broad base. The three upper lobes moreover are about twice as wide as the lower. The perianth tube is very slender in proportion to the size of the limb and the texture of the perianth is soft and delicate.

37. **Gladiolus scullyi** Bak., *Handb. Irid.* 224 (1892), *Fl. Cap.* 6 : 162 (1896); Dur. & Schinz, *Consp. Fl. Afr.* 5 : 224 (1893). Type: Cape, Namaqualand, *Scully* 158 (K, holo.). (Fig. 22.)

G. formosus Klatt in *Linnaea* 32 : 692 (1863) excl. syn. *Hebea bicolor* Eckl.; Bak. in *J. Linn. Soc.* 16 : 178 (1877), *Handb. Irid.* 225 (1892), *Fl. Cap.* 6 : 161 (1896), excl. syn.; Dur. & Schinz, *Consp. Fl. Afr.* 5 : 2; 3 (1893) excl. syn.; non Persoon (1805); *G. venustus* Lewis in *Jl S. Afr. Bot.* 7 : 56 (1941); Phill. in *Flower. Pl. S. Afr.* 23, t.895 (1943), nom. nov. Type: Cape, Clanwilliam district, Olifants River near Brakfontein, *Ecklon & Zeyher* 140 (B, holo., †, S, lecto.).

Corm ovoid, 0.8–4 cm diam., usually with several cormels at base, enclosed in tunics of hard dark or reddish brown more or less lignified fibres split up from the base into acuminate teeth, reticulate and connate above the middle, occasionally extending up in a neck 0.5–4 cm long. *Stem* slender or moderately slender, firm, flexuose, simple or branched, 10–70 cm long, usually 20–50 cm, with a single obtuse or acute hyaline sheath 2–10 cm long at the base. *Leaves* 4–7, the 3–4 lower erect, suberect or arcuate, the lowest usually about half

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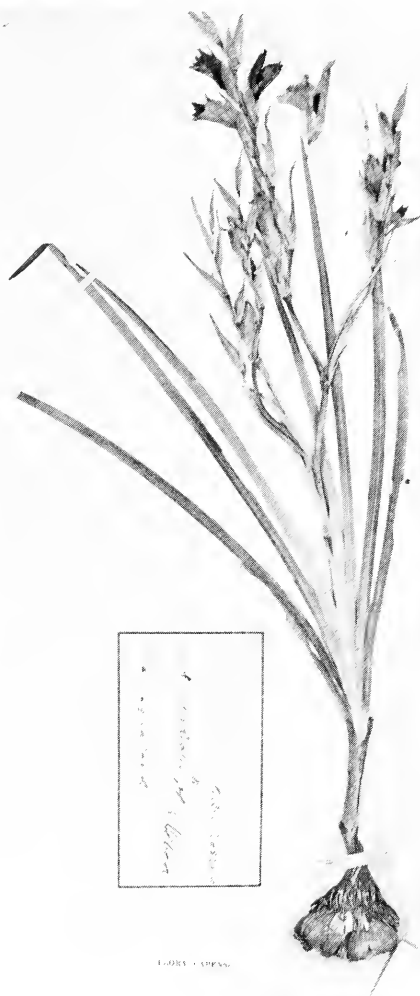


FIG. 22. Type of *G. scullyi* Bak. (Scully 158 K.).

Photo: By courtesy of the Royal Botanic Gardens, Kew.

as long as others which are generally slightly shorter than stem, sometimes as long or a little longer, with short to fairly long sheaths and linear acuminate blades 1–10 mm wide, moderately firm with the midrib fairly prominent and slightly raised margins, if wider with secondary veins; cauline leaves shorter than basal, the 1 or 2 upper 14–2,5 cm long. *Spike* fairly laxly 2–10-flowered (rarely 1), usually secund with the rhachis twisted and somewhat flattened. *Bract* oblong to lanceolate, subacute to acuminate, 1,6–3,3 cm long, sometimes with narrow hyaline margins; bracteole with hyaline margins, lanceolate or oblong-lanceolate, bidentate or very shortly bicuspidate, 1,2–2,5 cm long. *Flowers* fragrant, about 5 cm long, bilabiate, the tube and lower half of lobes cream, yellowish or lime-green and upper half most commonly pale to deep mauve but sometimes pink, reddish, purplish maroon, pale blue to mauve-blue or occasionally brownish. *Perianth tube* erect, thin, 1,1–1,7 cm long, the upper half funnel-shaped; *lobes* unguiculate, acute or with tapering acute or subacute tips, the 3 upper erect or porrect, partly overlapping to form a hood, subequal or the laterals smaller than the dorsal, the claw usually fairly short and wide and blade ovate, ovate-lanceolate or occasionally obovate, the dorsal lobe 2,5–3,6 cm long, 1–1,8 cm wide; 3 lower subequal or lowest slightly larger than laterals, 1,9–3,2 cm long, with slender suberect involute claws 5–12 mm long, connate to middle or almost to top, geniculate at the top and often with small auriculate lobes at the bend, the blades patent or subdeflexed, ovate, ovate-lanceolate or more or less elliptic, 0,7–1,1 cm wide. *Stamens* arcuate, arising 4–6 mm below top of tube; filaments 1,3–1,6 cm long; anthers linear, 6–9 mm long. *Ovary* rotund, 3–5 mm long; style reaching to middle or top of anthers, the branches oblanceolate, clavate or more or less oblong-spathulate, 3–5 mm long. *Capsule* pale brown, thin-walled, subglobose, shortly 3-lobed at the apex and broadly obcordate in side view, 1–1,7 cm long, encased in the long gaping, acuminate bract and bracteole; *seeds* yellow-brown, broadly winged, suborbicular or oblong-orbicular, 7–8 × 6–7 mm.

Recorded from the Cape Province from Namaqualand to Laingsburg and Swellendam in the south; fairly common in karroid somewhat dry areas, flowering from July to October. One of the commonest and most widespread species in the Cape winter-rainfall region.

COLOUR PLATE 12. G. J. LEWIS.—1, corm; 2, inflorescence and leaves; 3, flower full face, red form; 4, flower laid out; 5, top of style and stigma × 3; 6, bract; 7, bracteole; 8, flower full face, blue form; 9, capsule; 10, seed.

Cape.—Clanwilliam: Olifants River valley, Citrusdal (red form): Bidou valley (blue form). August 1962.

CAPE.—Caledon: near Hawston, *Wilman* 764 (BOL); Caledon, *Loubser* 396 (BOL); Genadendal, *Marloth* 7057 (PRE). Calvinia: near Hantam River, 40 km N.W. of Calvinia on Loeriesfontein road, *Lewis* 2509 (SAM 61816, PRE); Akkerdam, foothills of Hantam Mts., *Lewis* 5802 (NBG); Moorde-naarspoort, near Agterhantamberg, *Lewis* 2655 (SAM); Brandkop, between Nieuwoudtville and Loeriesfontein, *Stokoe* (SAM 55650), *Barker* 6482 (NBG); Brandvlei, *Salter* NBG 1409/37 (NBG); near Willemsrivier, 660 m, *Leipoldt* 784 (SAM); Wolwerivier, *Bond* 1175 (NBG); Kokerboomkop, *Acocks* 18964 (PRE); Grasberg, *Barker* 9548 (NBG); Klipkoppies, Nieuwoudtville, *Barker* 9533 (NBG); 13–16 km

from Nieuwoudtville on road to Karreebooms Farm, *Lewis* 5867 (NBG); Soetwater, between Calvinia and Nieuwoudtville, *Lewis* 5974 (NBG); 8 km E. of Nieuwoudtville, *Leistner* 401 (K, PRE); Wilgebosch Farm, near Calvinia, *Lewis* 5883 (NBG); between Kalkgat Suid and Blinkvlei, *Lewis* 5817 (NBG). Krantz, 10 km from Klawer, *L. Bolus*, NBG 1910/32 (BOL); Wiedou River, *Barker* 8421 (NBG), *Lewis* 2241 (SAM); Sandkraal, *Barker* 5661 (NBG). Ceres: Cold Bokkeveld, *Rycroft* 2535 (NBG), *Marloth* 6256 (PRE); Cold Bokkeveld, 64 km N. of Ceres, *Thomas* (NBG); Prince Alfred Hamlet, *Loubser* 403 (BOL); Gydo Pass, *Hafström & Acocks* 291 (S, PRE); near Theronberg Pass, between Karrooport and Ceres, *Dymond* (BOL 21224); between Hottentotskloof and Theronberg, *Acocks* 1635 (S); Hottentots Kloof, *Barker* 2050 (NBG); Karrooport, *Barker* 3016 (NBG); Ceres, *Lindeberg* (S); Ceres Mountains, *Marloth* 6255 (PRE); Ceres Karoo, Spes Bona, *Marloth* 10442 (PRE). Clanwilliam: Olifants River, near Brakfontein, *Ecklon & Zeyher* 140 (LD, S, G) & s.n. (P), *Zeyher* 141 (SAM); Citrusdal, *Barker* 3591 (NBG), *Buhr* NBG 294/37 (NBG); near Citrusdal, *Lewis* 1364, 1417 (SAM); 8–9 km N. of Citrusdal, *Leighton* 1096 (BOL, GRA, K, PRE), *Lewis* 5204 (NBG), *Martin* 817 (NBG); Clanwilliam, *Schlechter* 8596 (BM, BR, G, GRA, GRO, K, L, P, PRE, S, Z), *Barker* 5602, 5740 (NBG); between Clanwilliam and Citrusdal, *Wilman* 851 (BOL, LD, PRE), *Steyn* 525 (NBG); 16 km S. of Clanwilliam, *Salter* 3655 (BM, K); near Olifants River, *Schlechter* 5006 (AMD, BM, BOL, BR, C, GRA, PRE, S, UPS, Z); Olifants River valley, *Leipoldt* (BM); 40 km N. of Citrusdal, *Barker* 8544 (NBG); near Nardou road, *Barker* 2052 (NBG); Nardou road, *Martin* 844 (NBG); road to Wupperthal, *Leipoldt* (BOL 20776), *Martin* 801 (NBG); Wupperthal, *Marloth* 7452 (PRE), *Lewis* 5457 (NBG); Koudeberg, near Wupperthal, 800 m, *Bolus* 9096 (BOL); Bidou Mts, 630 m, *Compton* 7762 (BOL, NBG); Bidou, *Compton* 24229 (NBG); mountain slopes above Welbedag, *Lewis* 5221 (NBG); S. slopes of Pakhuis Pass, *Salter* 3631 (BM, K); Matjies River, *Wagner* 141 (NBG); near Brandewynrivier, *Lewis* 1844, 2306 (SAM), *Barker* 2051 (NBG); 9 km S.W. of Doorn (Doring) River, *Lewis* 2305 (SAM); 16 km from Doorn River Bridge at Doornbos, *Middlemost* 1620 (NBG); Cedarberg, Donkerkloof Kop, *Stokoe* (SAM 63496); Citadel Kop, *Compton* 24251 (NBG). Ladismith: Buffelskloof, near Ladismith, *Esterhuysen* 14012 (BOL). Laingsburg: Tweedside, *Lewis* (BOL), *Acher* 376 (BOL), *Barker* 7498 (NBG); Matjiesfontein, *Acocks* 17143 (K, PRE); Whitehill, 1 000 m, *Compton* 3660 (BOL), 11254, 14883 (NBG); near Laingsburg, *Eliovson* 325 (PRE). Namaqualand: Tierkloof, N.W. of Steinkopf, *Hardy* 712 (K, PRE), *Van Breda* 1374 (PRE); near Steinkopf, *Salter* 3745 (BM, BOL, K), *Herrke* Stell. Un. Gdn. 3562 (BOL), *M. Schlechter* 118 (BOL, BR, GRA, PRE), s.n. (BM, G, GRO, K, L, P, S, Z), *Acocks* 19540 (K, NBG, PRE); Koe Mt., *Pearson* (WAG); Eselsfontein, W. of Springbok, *Barker* 6654 (BOL, NBG, SAM); Spektakel Hill, *Bolus* HAA 700 (BOL, BM, G, GRA, K, P, PRE, SAM, UPS); near Garies, *Leipoldt* 3835 (BOL), *Loubser* 2023 (NBG); between Bloustasie and Mesklip, *Lewis* 5752 (NBG); Bitterfontein, *Compton* 22818 (NBG); Kleinkoppies, *Schlechter* 10984 (BM, BR, G, GRA, GRO, K, L, P, PRE, S, SAM, Z); without precise locality, *Morris* in herb. Bolus 5795 (BOL, K), *Scully* s.n. (BOL 27530), 158 (K). Piketberg: Het Kruis, *Stephens & Glover* 8618 (K). Sutherland: 75 km S. of Sutherland, *Leighton* 3179 (BOL); below Komsberg Pass, *Acocks* 17189 (PRE). Swellendam: near Bonnievale, *Dymond* (BOL 21192); 3 km E. of Barrydale, *Hall* 1430 (NBG). Vanrhynsdorp: Knersvlakte, *Esterhuysen* 5941 (BOL, PRE), *Bond* 1123 (NBG); Heerenlogementberg, 330–660 m, *Taylor* 3930 (NBG); Vanrhyns Pass, *Mauve* 4146 (PRE); Vanrhynsdorp, *Rood* sub PRE 27061 (PRE). Worcester: Karoo Garden, Worcester, *Rycroft* 1795 (NBG), *Hall* (NBG), *Martin* 1189 (NBG); Brandvlei, *Salter* 6840 (BOL, BM, SAM); between Osplaats and Tunnel Sidings, 700–1 000 m, *Rogers* 16742 (BOL); top of Hex River Pass, *Zinn* (SAM 67317); Hex River, *Drège* 8430 (P); Worcester Veld Reserve, *Olivier* 107 (PRE).

WITHOUT LOCALITY: *Mund* (K).

Gladiolus scullyi with its snapdragon-like flower is widespread and common in the western Cape from Namaqualand to Clanwilliam, spreading eastwards to Ladismith, Laingsburg and Sutherland, though rare in the southern districts from Caledon to Swellendam. It inhabits karroid, fairly dry areas and varies somewhat in stature, which according to Acocks is usually the result of habitat for when growing inside bushes they tend to be taller. After the copious spring rains plants of this species were seen flowering in their hundreds by Mr E. Oliver, between Spektakel and Nababeep in Namaqualand in September 1970.

The three lobes of the upper lip of the flower are usually more or less overlapped to form a semi-erect hood while those of the lower lip have a marked knee-bend at the top of the claws with the blades projecting forwards or downwards. Although there is much variation in flower colour the blue form is the most common. It is closely related to *G. permeabilis* and in dried specimens it is

often difficult to separate them when the lower lip has lost its shape.

The species was known by the name *G. formosus* Klatt in early literature until Lewis pointed out that this name was a homonym and renamed it *G. venustus*. However, a study of the type of the little known *G. scullyi* Bak. led to the conclusion that it was a more robust form of the same species and so the name *G. venustus* falls away.

In the southern Cape districts of Caledon, Bredasdorp, Barrydale and Robertson small, few-flowered plants have been collected which appear to be intermediate between *G. scullyi* and *G. permeabilis*. They might possibly be hybrids between these two species or reduced forms of either of the above which in the dried state are difficult to recognize.

38. *Gladiolus arcuatus* Klatt in Abh. Naturf. Ges. Halle **12** : 338, Ergänz. 4 (1882); Baker, Handbk. Irid. 224 (1892) et Fl. Cap. **6** : 161 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893). Type: Cape, Namaqualand, Mierenkasteel, *Drège* 2629 (B, holo, S, P).

Corm subglobose, 1–2 cm diam., with thin brown submembranous tunics. *Stem* slender, simple, tortuous, 9–35 cm long, with a single brownish or colourless obtuse or acute sheath 2.5–8 cm long at the base. *Leaves* 3–5, usually 4, the 3 lower linear, falcate, 12–30 cm long, 1–4 mm wide, usually puberulous on the sheath and on the more or less prominent margins and midrib of the blade; upper cauline leaf erect, subulate or occasionally lanceolate, 3–9.5 cm long, usually puberulous. *Spike* subsecund, the rhachis tortuous, 2–9-flowered. *Bract* lanceolate or oblong-lanceolate, acuminate or acute, 4–2 cm long, usually with narrow hyaline margins; bracteole similar to bract but shorter and usually minutely bidentate. *Flowers* fairly small, fragrant, bilabiate, mauve or purplish with the lower half of 3 lower lobes lime-green or yellowish. *Perianth tube* 1.2–1.4 cm long, curved a little above the middle and narrowly funnel-shaped above; *lobes* more or less elliptic-unguiculate, subacute, somewhat undulate, the dorsal porrect, 2.3–3.3 cm long, 1–1.5 cm wide, the claw 3–5 mm wide at the base; upper laterals patent, 2–2.5 cm long, 0.8–1.1 cm wide; 3 lower deflexed, subequal or the lowest sometimes slightly narrower and longer than laterals and more or less lanceolate-unguiculate, 2–2.9 cm long, 0.5–1 cm wide, with slender claws about 1 cm long, connate for 5–8 mm. *Stamens* arcuate, arising 3 mm below top of tube; filaments 1.3–1.5 cm long; anthers linear, 7–9.5 mm long. *Ovary* ellipsoid or subtrubinate, 5–7 mm long; style reaching nearly to top of anthers, with spatulate branches 3–4.5 mm long.

Recorded from Namaqualand in the Cape Province and southern South West Africa where it is occasional or sometimes locally frequent in sandy soil among boulders in valleys; flowering in August and September.

CAPE.—Namaqualand: Mierenkasteel, *Drège* 2629 (B, S, P); Groenrivier, *Drège* 2629b, (B, G, S); between Silverfontein, Koperberg and Kaus, *Drège* 2629c, (BM, K, L, OXF, P); Kweekrivier, *Drège* (P); 4 km N.E. of Nigramoep, *Acocks* 19410 (NBG, PRE); Spitskop, 9 km S. of Steinkopf, *Lewis* 5484 (NBG); Steinkopf, *Marloth* 6708 (PRE), Stiel, Ün. Gdns. 3562 (BOL); Brakdam, *Compton* 22784

(NBG); near Grootvlei, *Lewis* 5217 (NBG), *Middlemost* 1634 (NBG), *Thomas* (NBG); Kamieskroon, *Barker* 2043 (NBG). Vamrhynsdorp: 3 km N.E. of Vredendal, *Hall* 91951 (NBG).

SOUTH WEST AFRICA.—Klinghardtberg, *Dinter* 3920 (B); Halenberg, *Dinter* 4093, 6658 (B).

This species can be recognized by the sheathing portion of the leaves being minutely hairy (rarely glabrous), and its short, bent and twisted stem, a character which makes it unsuitable for cultivation although the flowers are attractive and have a sweet freesia-like scent. It is distinguished from *G. scullyi* to which it is closely allied, by its much softer, submembranous corm tunics, tortuous simple stem, puberulous leaves and lower perianth lobes not having a geniculate bend at the top of the claw. Neither Klatt nor Baker mentioned the hairs on the leaves, and two of the collections cited under *G. arcuatus* by Baker in the *Flora Capensis* are the same as *G. scullyi* Baker, which led to some confusion and a misconception of *G. arcuatus*.

The species is not uncommon in the north-western parts of Namaqualand but appears to be rare in South West Africa where it is known only from Dinter's collections cited above. These seem to represent a distinct form which differs in having more fibrous corm tunics, the leaves glabrous or only very minutely and sparsely puberulous, and slightly smaller flowers, the dorsal lobe with a more slender claw. The colour of the flowers is not recorded. The very flexuose stem, arcuate leaves and hyaline-edged bracts are the same as in the typical Namaqualand form.

39. **Gladiolus salteri** Lewis, sp. nov., *G. arcuato* affinis sed foliis glabris latioribus, bracteis longioribus et latioribus margine non hyalina, floribus majoribus, perianthii tubo multo longiore differt.

Cormus ovoideus c. 2,5 cm diam., tunicis duris grosse fibrosis. *Folia* 3–4 arcuata vel erecta ad 22 cm longa et 12 mm lata glabra coriacea marginibus et costis prominentibus. *Scapus* saepe ramosus arcuatus, rhachis flexuosa, floribus usque ad 20 secundis. *Bracteae* lineari-lanceolatae c. 2 cm longae semi-amplacentes. *Flores* pallide rosei lobis inferioribus maculis roseis et flavis, *perianthii-tubus* 1,5 cm longus angustus lobis longe unguiculatis anguste spathulatis.

Type: Cape, Namaqualand district, near Springbok, *Salter* 3798 (BOL, holo., BM, K).

Corm ovoid, 1,5–2 cm diam., with tunics of fairly coarse reddish brown vertical fibres cut up into acuminate teeth from the base and more or less connate above. *Stem* moderately slender, simple or branched, usually flexuose and more or less reclinate near the middle, 18–35 cm long, with a single hyaline obtuse sheath 4–11 cm long at the base. *Leaves* 3–4, rarely 2, usually falcate, ensiform or lanceolate, acute or occasionally subobtuse, 15–30 cm long, 0,25–1,4 cm wide, with slightly prominent margins and midrib. *Spike* secund, 3–10-flowered. *Bract* lanceolate or oblong, acuminate or acute, 2,5–1,5 cm long; bracteole similar to bract and as long or slightly shorter, usually minutely bidentate. *Flowers* small, bilabiate, pale pink with deeper pink bands outlining

a yellow somewhat rhomboidal patch in middle of lower lobes. *Perianth tube* 1,6–2,3 cm long, curved and with a slight geniculate bend near the top, slender below and narrowly funnel-shaped above the bend; *lobes* unguiculate with more or less elliptic blades, the dorsal at first arcuate, soon becoming erect, 2,8–3,3 cm long, 6–8 mm wide, the claw 2–3 mm wide, nearly as long as the blade; upper laterals patent, like the dorsal but slightly smaller, 2–2,5 cm long, 6–8 mm wide; 3 lower subequal, projecting forward with the tips deflexed, 2–2,3 cm long, 4–7 mm wide, the rather long slender claws connate for 2–4 mm, granulose at the base and below in the throat of the tube. *Stamens* arcuate, arising 3 mm below top of tube; filaments 2,2–2,4 cm long; anthers linear, subsagittate, 5–7 mm long. *Ovary* globose, 3–4 mm long; style reaching to about middle of anthers, the branches linear-oblongeolate or oblongeolate, conduplicate, 4–5 mm long. *Capsule* (immature) subglobose, shortly 3-lobed at the apex, about 1 cm long.

A rare species, possibly locally endemic; known only from Namaqualand in the western Cape, near Springbok, on stony hillsides, flowering in September.

CAPE.—Namaqualand: 28 km E. of Springbok, *Salter* 3798 (BOL, BM, K); *Barker* 6666 (NBG); without precise locality, *Stokoe* 6193 (BOL).

The localities given for the collections made by Captain Salter in 1933 (in whose honour the species is named) and Miss Barker in 1950 are 28 km to the east of Springbok and 28 km to the north-east but it is more than likely that they were made on the same hills, near the Koperberg, on the Springbok–Pofadder road. The description of this very distinct species is drawn from the ample material collected by Miss Barker.

The species obviously belongs to the *scullyi-arcuatus* group but is well distinguished from the others by its flat, more or less falcate leaves, the longer tube of the perianth and its less irregular lobes which are all much alike in shape, size and the length of the claw. As far as can be seen in the dried state, the dorsal lobe becomes erect when the flower is fully open, and the three lower appear to project forward instead of being markedly deflexed as in the other species in the group.

40. **Gladiolus kamiesbergensis** Lewis, sp. nov., *G. marlothii* affinis sed foliis glabris angustioribus, superioribus bracteis similibus scapo inter nudo differt. *Cormus* ovoideus vel globosus 2 cm diam. tunicis mollibus in collum fibrosum ad 11 cm altum productis. *Scapus* simplex ad 90 cm longus. *Folium* basale ad 110 cm longum cruciforme in sectione transversa; folium secundum parum minor; folium tertium multo reductum et folia dua superiora bracteis similia, scapus inter nudus. *Perianthium* parvum 3,5 cm longum lilacinum violaceo maculosum, lobi unguiculati ovati vel late oblongi, lobi inferiores minores. *Capsula* rotundata c. 1,5 cm diam.; semina late alata 5 mm diam.

Type: Cape, Namaqualand, Kamiesberg, Welkom near Garies, *Esterhuysen* 23716 (BOL, holo., K).

Corm ovoid or subglobose, 2–3 cm diam., with matted tunics of fine pale brown fibres extending up in a neck 6–7.5 cm long. *Stem* slender, simple, straight or subflexuose, 45–90 cm high, with 2 reddish brown submembranous basal sheaths 10–22 cm long. *Leaves* 3–5, the lowest with a fairly long sheath and very long subterete blade overtopping the stem, firm, sulcate, 1–2 mm diam.; second similar but with a longer sheath and shorter blade, and upper cauline much shorter, usually reduced to bract-like sheaths, the uppermost 3–5 cm long. *Spike* secund, laxly or fairly closely 4–10-flowered. *Bract* oblong or ovate-oblong, obtuse or subacute, pale yellowish green, usually submembranous at the apex with fine reddish brown veins, 1.5–1.8 cm long; bracteole slightly shorter, submembranous, bidentate. *Flowers* small, bilabiate, mauve finely speckled with minute violet dots. *Perianth tube* curved, narrowly funnel-shaped, 1.2–1.5 cm long; *lobes* unguiculate, obtuse or subacute, minutely apiculate, the dorsal spathulate, arcuate, hooded, 2 cm long, 1–1.4 cm wide; upper laterals 1.6–1.8 cm long, somewhat obliquely spathulate with slender claws 5–8 mm long connate to claws of lower lobes, the blades patent, 0.7–1 cm wide; 3 lower projecting forward, 1.8–2 cm long, with slender claws 0.8–1 cm long, the laterals slightly longer than lowest, connate nearly to top, and broadly oblong or ovate-oblong blades, the lowest 6–8 mm wide and laterals 4–5 mm. *Stamens* arcuate, arising 2–3 mm below top of tube; filaments about 1.2 cm long; anthers linear, subsagittate, 6–7 mm long. *Ovary* oblong or subtrubinate, about 3 mm long; style reaching nearly to top of anthers, with spathulate branches 2–3 mm long. *Capsule* rotund or subtrubinate, 1.3–1.8 cm long, thin-walled, brownish; *seeds* broadly winged, oblong, 5–6 mm long, yellow brown.

Restricted to the Kamiesberg area in Namaqualand, where it occurs at altitudes of 1 300–1 500 m, flowering in October.

CAPE.—Namaqualand: Welkom, Kamiesberg near Garies, *Esterhuysen* 23716 (BOL, K); Sneekop, Kamiesberg, *Hutchinson* 871 (BOL, K); De Kom (now farm Karas) 5 km from Leliefontein on Kamiesberg, *Leipoldt* 3594 (BOL); without precise locality, *Stokoe* 7335 (BOL, K).

As far as is known this delicate small-flowered species is an endemic on the upper slopes of the Kamiesberg. It is related to the variable *G. permeabilis* but possibly through isolation it evolved a more robust habit and somewhat larger spotted flowers. It is also related to *G. marlothii* but in this species the leaves sheathe the scape completely whereas in *G. kamiesbergensis* the upper leaves have been reduced to bracts exposing the scape.

41. ***Gladiolus permeabilis*** Delaroche, Descr. Pl. Nov. **27**, t.2 (1766). Type: herb. Van Royen (L904, 137–144, L, holo!, PRE, photo); a plant growing in the nursery of Van Hazen in Leiden. (See Fig. 23.)

Plants (10) 30–50(–90) cm tall, growing singly or rarely in small clumps. *Corm* subglobose, 1–3 cm in diam. with soft to somewhat coarse brown fibres, sometimes extending up in a neck, occasionally forming a few hard, pointed cormlets on short runners or with much sessile spawn. *Leaves* surrounded at the



FIG. 23. Type of *G. permeabilis* Delaroché.

Photo: National Herbarium, Pretoria.

base by 2 tubular membranous sheaths, 3–8 cm long, distichous, 3–5, erect, with subterete to linear blades 20–50 cm long, 0.5–3 mm wide, about as long as the spike when well developed, apex subulate, below suddenly widened in a sheathing base, midrib and margins prominent, firm, glabrous. (The leaves from plants growing in the eastern Cape often evergreen but those from Natal often leafless during anthesis because of unfavourable conditions.) *Inflorescence* with 1–4 basal branches or simple through reduction; scape erect, firm, terete, bearing 1–3 short sheathing bracts, rhachis often laxly flexuose. *Flower bract* narrowly oblong to narrowly ovate, 1–2 cm long, about 5 mm wide, acute or acuminate, with the smaller bracteole forming a narrow tube around the base of the flower but free from the rhachis, dull greyish green or purplish or brownish, obscurely striate, enlarging somewhat in the fruiting stage. *Flowers* 5–16, distichous and close together in bud, secund at anthesis, small (3–5 cm long) often fragrant, bilabiate, varying in colour from white to cream to various muted shades of mauve, pink, brown or grey, midrib usually dark, lower lobes often with an irregular transverse yellow band or tipped with maroon. *Perianth tube* straight or slightly curved usually shorter than the limb, 0.5–1.2 cm long; *lobes* unequal, clawed or somewhat contracted with the apices obtuse to acute to acuminate to caudate; upper lobe erect or somewhat hooded, 2–3 cm long, 1–1.4 cm wide; the clawed upper laterals and lower lobes fused at the base to form the concave basal part of the lower lips and thus forming an opening between the upper and lower lips, giving it its ‘permeable’ or ‘see-through’ appearance when seen sideways; lower lobes rhomboidal, somewhat smaller than the upper lobes, the free blades usually geniculate at the base, often with involute margins. In the ssp. *wilsonii* the lobes are narrowed but not clawed and the flower is therefore not ‘permeable’; in the ssp. *edulis* the apices of the lobes are attenuated into long tails. *Stamens* arcuate, arising near the top of the tube, anthers 5–8 mm long. *Ovary* ellipsoid to oblong, 3–5 mm long; style reaching to middle or top of anthers, the branches clavate to spatulate, 3–5 mm long. *Capsule* ellipsoid or oblongo-ellipsoid, pale, thin walled, nervose, 1–2 cm long; *seeds* reddish brown with broad wings, 6–7 mm long.

The species has been divided into 3 subspecies.

KEY TO SUBSPECIES

Perianth with the lobes obtuse to acute:

Perianth lobes clawed forming a gap between the upper and lower lip when the flower is viewed from the side; perianth gaping with the lobes spreading

(a) ssp. *permeabilis*

Perianth lobes without claws, somewhat contracted but not showing a gap between the lips when viewed from the side; perianth with the lobes fairly close together; corolla often producing much spawn and plants caespitose

(b) ssp. *wilsonii*

Perianth with the lobes caudate and spreading; occasionally sarmentose

(c) ssp. *edulis*

(a) ssp. *permeabilis*

G. permeabilis Delaroche, Descr. Pl. Nov. **27**, t.2 (1766); Burm. f., Fl. Cap. Prod. **2** (1768); Houtt., Nat. Hist. **II**, 12 : 52 (1780); Spreng., Syst. **1** : 151 (1825); Ker, Gen. Irid. 131 (1827); Klatt in Linnaea **32** : 696 (1863); Baker,

Handb. Irid. 225 (1892), Fl. Cap. 6 : 162 (1896) excl. syn. *G. dichotomus* Thunb.; Dur. & Schinz, Conspect. Fl. Afr. 5 : 222 (1893). Batten & Bokelmann, Wild Flrs E. Cape Prov. t.29, 2 (1966). Type: herb. Van Royen (L904,137-144, L, holo., PRE, photo.), ex nursery Van Hazen.

G. fredericii L. Bol. in S. Afr. Gdng & Ctry Life 21 : 367 (fig.), 369 (1931); Batten & Bokelmann, Wild Flrs E. Cape Prov. 42, t.33, 4 (1966). Type: Grahamstown, Commonage, R. A. Dyer 1682 (BOL, holo., GRA, K, PRE).

Hebea zeyheri Eckl., Top. Verz. 42 (1827) nom. nud. Based on Uitenhage, Swartkops River valley, *Ecklon & Zeyher* s.n. (Br, G, L, LD, PRE, S, UPS, Z).

The flowers of this subspecies vary in colour from white to cream with the tips of the lobes mauve or mauvy pink, or pale to dark mauve or greyish mauve, sometimes with a red or purplish median line on the lobes and usually an irregular white or yellow transverse band on the 3 lower. In shape the perianth is intermediate between the other 2 subspecies. In habit it is more wiry like ssp. *edulis*. It is sweetly scented during the day but Acocks observed that it was also fragrant at night.

Its distribution is from Caledon to Albany in the coastal areas where it is found in grasslands or amongst clumps of Restios and Bobartias, flowering from August to November.

CAPE.— Albany: Grahamstown, *Glass* 296 (SAM), *Dyer* 1682 (BOL, GRA, K, PRE, type of *G. fredericii*), *Marloth* 10903 (PRE), *Martin* 1184 (NBG), *Rogers* 4411 (BOL) 30136 (G, K, Z), *Mullins* (NBG), *Bayliss* 2464 (NBG); near Grahamstown, *MacOwan* 59 (K, Z), *Galpin* 195 (K, PRE); Springvale Station, *Story* 3169 (PRE); Howieson's Poort, near Grahamstown, *Barker* 6943 (NBG); *Hutchinson* 1551 (K), *Dyer* 199 (PRE); 26 km from Grahamstown, *Dyer* 1685 (PRE, K, GRA); 38 km E. of Grahamstown, *Hall* 247 (NBG); Atherstone, *Sidey* 1235 (S). Alexandria: Bushmans River Bridge, *Johnson* 1043 (PRE). Bathurst: Port Alfred, *Rogers* 28067 (Z); Bathurst district, *Sidey* 3165 (PRE). Caledon: Genadendal, *Marloth* 7057 (PRE). George: Wilderness, *Blake* (BOL 27543); Outeniqua Pass, ✓ *Werdermann & Oberdieck* 869 (PRE). Humansdorp: Jeffreys Bay, *Middlemost* 1786 (BOL, NBG, SAM); Slangkop, *Phillips* 3368 (PRE). Mossel Bay: Hessaquaskloof (? Attaquas Kloof) *Zeyher* 3993 (SAM); Cloete's Pass, *Stayner* (NBG); Robinson Pass, *Taylor* 287 (BOL). Port Elizabeth: near Walmer, *Holland* 3718 (BOL); Humewood, *Paterson* 18 (BOL); Walmer, *Paterson* 130 (PRE, GRA); Bethelsdorp, *Paterson* 13 (GRA); Redhouse, *Paterson* 46 (BOL, GRA); Port Elizabeth, *Holland* (BOL 27541, 27542), *Long* 245, 482 (K, PRE), *Cory* (BOL 27538); *Bokelmann* (NBG); Krakakama, *Ecklon & Zeyher* 146 (S). Swellendam: Buffelsjag River, *Zeyher* 3990 (SAM, GRA). Uitenhage: Suurberge, 800-1 150 m, *Drège* 8422 (G, K, P, S); Uitenhage, *Pappe* (SAM 48501); Swartkops River, *Zeyher* 3991 (P, Z, S, SAM), *Pappe* 133 (SAM), *Ecklon & Zeyher* 139 (G, LD, S, Z), s.n. (BR, G, LD, L, PRE, S, UPS, Z), *Ecklon* (S); Uitenhage, *Zeyher* 42 (K), 254 (BM); Galgebosch, *Drège* 8421 (P, S). Uniondale: Hills near Avontuur, *Fourcade* 3165 (BOL); *Marloth* 10947 (PRE); N. side Prince Alfred Pass, *Acocks* 19666 (K, PRE); Joubertina, *Esterhuysen* 6913 (BOL).

WITHOUT LOCALITY: *Pappe* (S), *Sparman* (S); *Verreaux* (G), herb. Van Royen (L, no. 904, 137/145); *Ecklon & Zeyher* (P); herb. Gronovius (BM); *Zeyher* 1626 (K); herb. Ventenat (G—matches type); *Ecklon* (AMD).

In the Rijksherbarium at Leiden, Holland, in the Van Royen collection are two sheets, Nos. 904,137-142 and 904,137-144, which represent contemporary material. With it is a description of the plant drawn up by David van Royen on 15 August 1766 for the use of Delaroche. Actually there are two copies, the one a first attempt and the second the improved revised version. Except for a few words which were omitted or changed, Delaroche copied this revised description in his thesis (cf. also notes under *G. involutus*). Delaroche chose the name 'permeabilis' on account of the 'permeable' or 'see through' gap seen

behind the upper and lower lips when the flower is viewed in profile. Van Royen in the annotated Delaroche copy sent to Linnaeus here too added 'ex viva planta' in the margin.

(b) ssp. **wilsonii** (Bak.) Lewis stat. et comb. nov.

Tritonia wilsonii Bak. in Gard. Chron. **26** : 38 (1886); Fl. Cap. **6** : 125 (1896). Type: Cape, in the neighbourhood of Port Elizabeth, *Wilson* (K, holo.), described from a living plant and sketches sent to Baker in June 1886 by Mr John Wilson who had received them from his brother of Port Elizabeth. *T. teretifolia* Bak., Handb. Irid. 194 (1892), Fl. Cap. **6** : 124 (1896). Type: Natal, near Pietermaritzburg, at foot of Table Mountain, *Krauss* 430 (BM, holo., OXF).

Gladiolus inandensis Bak., Handb. Irid. 207 (1892), Fl. Cap. **6** : 144 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 219 (1893); Wood & Evans, Natal Plants 3, t.236 (1902). Type: Natal, Inanda, *Wood* 177 (K), 237 (K, lecto, BM, GRA). *G. microphyllus* Bak., Handb. Irid. 206 (1892), Fl. Cap. **6** : 143 (1896); Dur. & Schinz, l.c. 221. Type: eastern Cape, Griqualand East, Suurberg Range, near Kokstad, *Tyson* 1852 (K, holo., GRA, SAM).

G. stenophyllus Bak. in Kew Bull. **1897** : 282 (1897), non Schrank (1822). Type: Cape, Queenstown, Hangklip, *Galpin* 1769 (K, holo., BOL, GRA, PRE). *G. microsiphon* Bak. in Bull. Herb. Boiss. ser. 2, **4** : 1006 (1904). Type: Natal, hills near Pinetown, *Schlechter* 3167 (Z, holo., B, G, GRA, K, PRE, SAM).

G. permeabilis Delaroche forma, Batten & Bokelmann, Wild Flrs E. Cape Prov., 43, t.34, 4 (1966).

In this subspecies the flower has a more closed appearance because of the absence of the claws. The lobes are also broader and the dorsal lobe is more hooded. The flowers are usually paler, white or cream, the tips and midribs sometimes dark reddish purple or tinged with pink or mauve and the three lower lobes occasionally possess some fine reddish lines at the base. At times an abundance of sessile cormlets attached to the mother-corm is present and the plants may be caespitose. In the eastern Cape the leaves usually persist for a long time because of the temperate climate but in Natal at higher altitudes where frosts and veld fires occur, they have usually perished on the early flowering plants.

It is common in the eastern Cape extending to the southern districts of Natal, flowering from September to November. Batten & Bokelmann record it as common in the open veld near the coast where it appears in masses.

FIG. 24. From a painting by G. J. Lewis.— Inflorescence; flower front view; flower laid out; bract and bracteole; corm and base of stem and leaves.

Cape.—Bathurst, Kenton, *Mullins* (NBG 77201), ex hort. Kirstenbosch. November 1964.

CAPE.—Bathurst: Kenton, *Mullins* (NBG); Rietfontein between Theopolis and Port Alfred, *Burchell* 4048 (K); between Rietfontein and sea, *Burchell* 4115 (K); Port Alfred, *Britten* 5150 (K, GRA) 5050 (GRA). Cathcart: Windvogelberg, 1 500 m *Drège* 3501 (K, L, P); Cathcart, *Sidey* 3845 (PRE).

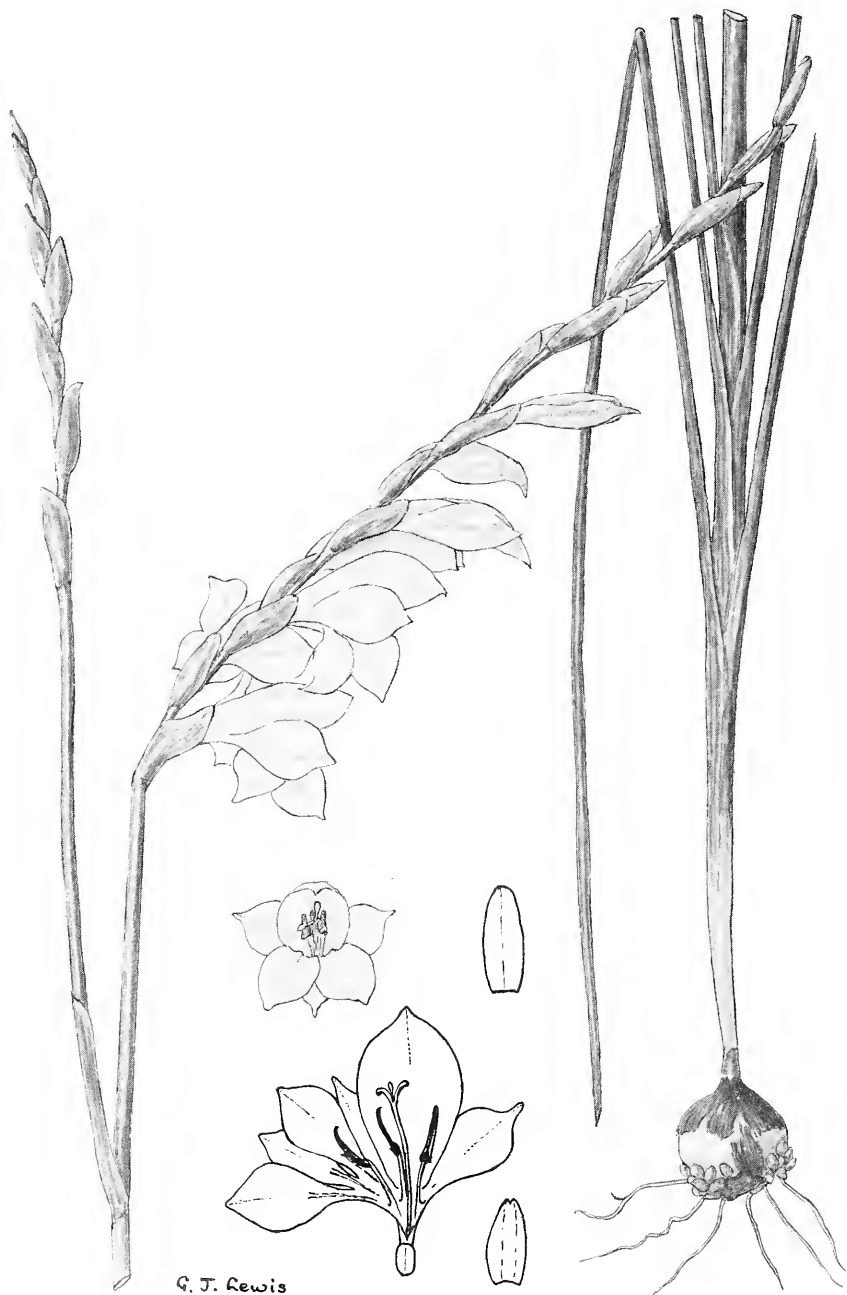


FIG. 24. *G. permeabilis* subspecies *wilsonii*.

East London: Near Kidd's Beach, *Barker* 104 (BOL), 2047, 6961 (NBG), *Compton* 17806 (BOL, NBG); Gonubie Springs, *Cassidy* 232 (NBG); Gonubie, *Bokelmann* (NBG); Buffalo Pass, *Barker* 3521 (NBG); East London, *Barker* 2832 (BOL, NBG), *Bokelmann* (NBG), *Rattray* in herb. *Galpin* 7879 (PRE); Selbourne, *Smith* 3716 (PRE). King William's Town: near Berlin, *Acoks* 20095 (K, PRE). Komga: near Kei Mouth, *Codd* 6342 (PRE), *Compton* 17665 (NBG); Kei road, *Ranger* 257 (K, PRE); near Komga, *Flanagan* 420 (PRE). Maclear: Ugie, *Schnell* (BOL 27510). Matatiele: Matatiele, *Jacottet* (Z). Mount Currie: Kokstad, *Kelly* (NBG). Port Elizabeth, *Wilson* (K—type of *Tritonia wilsoni*). Queenstown: Hangklip, *Galpin* 1769 (type of *G. stenophyllus*, K, holo., BOL, GRA, PRE). Stockenström: between Philipton and Katrivier, *Ecklon & Zeyher* 141 (S). Stutterheim: Dohne Research Station, *Acoks* 9261 (PRE). Umtata: mountains about Baziya, 1 000 m, *Baur* 528 (BOL, K). Umzimkulu: Suurberg Mt., between Kokstad and Clydesdale (Criquealand East), *Tyson* 1852 (GRA, SAM—type of *G. microphyllus*).

NATAL.—Alfred: Harding, *Wheeler* (AMD). Camperdown: Botha's Hill, *Wood* 529 (BOL), 4726 (GRA, SAM); Montesceel, *Strey* 4830 (PRE). Durban: near Durban, *Wood*, s.n. (P); Port Natal, at the foot of Table Mountain, *Krauss* 430 (K—holo., of *Tritonia teretifolia*, OXF, BM), *McLaughlin* (BOL 27511). Ixopo: Umkomaas, *Wood* 12460 (PRE). Kranskop: Kranskloof, *Rogers* 24615 (Z). Ndwedwe: Inanda, *Wood* 177 (K) 237 (BM, GRA, K); *Rehmann* 8273 (Z). Pinetown: hills near Pinetown, *Schlechter* 3167 (type of *G. microsiphon*, holo., PRE, B, GRA, K, BM, G, SAM), *Wood* 4902 (BOL, PRE); Kloof, *Galpin* 12083 (PRE), s.n. (BOL); *Rogers* 24615 (PRE). Port Shepstone: Oribi Gorge, *Martin* 930 (NBG); Port Shepstone, *Letty* 235 (PRE). Umzinto: Dumisa, *Rudatis* 704 (PRE), 709, 1162 (K, BM), 1162 (GRO, L, P, G, Z, S). Without locality: *Sanderson* (K); *McLaughlin* (BOL 27511).

(c) ssp. **edulis** (*Burch. ex Ker*) *Oberm.*, stat. nov.

G. edulis Burch. ex Ker in Bot. Reg. **6** : 169 (1817) et Gen. Irid. 142 (1827); Spreng., Syst. Veg. **1** : 151 (1825); Bak., Handb. Irid. 225 (1892), Fl. Cap. **6** : 161 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 216 (1893); Phill. in Ann. S. Afr. Mus. **16** : 282 (1917); R. A. Dyer in Flower. Pl. Afr. **26**, t.1017 (1947); Flugge-de-Smidt, Flrs by the Roadside 33, photo. (1947); Batten & Bokelmann, Wild Flrs E. Cape Prov. t.29, 3, 4; t.32, 1 (1966). Type: northern Cape, Kuruman (Litakun) Pellat Plains, *Burchell* 2240 (K, holo, B). The drawing was made in September 1816 from a plant growing in Burchell's garden at Fulham. *G. remotifolius* Bak. in Bull. Herb. Boiss. ser. 2, **1** : 867 (1901). Type: Transvaal Highveld, between 'Poster' and Trigardtsfontein, *Rehmann* 6618 (Z, holo.). *G. halenbergensis* Dint. ex Sölch in Beitr. Fl. S.W.A. Diss. Univ. Munich 129 (1960); Prodr. Fl. S.W.A. 155 : 4 (1969) nom.

The perianth lobes with their caudate tips up to 8 mm long give the flower a 'spidery' appearance. The colour varies from white to cream, sometimes tinged with pink or mauve to pale grey or mauve-grey, greenish, brownish or greenish yellow, often with a deep pink, crimson, maroon or purplish median line on all the lobes or the upper laterals and lowest with a dark line and lower laterals with an irregular yellow transverse band or blotch or hastate mark near the middle outlined in purple or maroon or with fine dark lines above and below, occasionally with a velvety texture.

The subspecies is widely distributed although never frequent and has been recorded from all parts of southern Africa except Namaqualand and the south-western districts of the Cape. It has been collected on grassy slopes, sandy flats near river banks, black 'turf', limestone areas and rocky ridges from near the sea to an altitude of 3 000 m in the Drakensberg. There is no definite flowering period but it is mainly in spring in the south and in summer and autumn in the north depending probably on the rains.



FIG. 25. *G. permeabilis* subspecies *edulis*.

FIG. 25. From a painting by G. J. Lewis.—1, inflorescence; 2, corm and base of stem; 3, dorsal lobe; 4, upper lateral lobe; 5, median lower lobe; 6, inner lower lobe; 7, side view of flower; 8, flower, front view; 9, bract; 10, bracteole; 11, stamen $\times 2$; 12, gynaeceum $\times 2$.

Cape.—Uitenhage, Despatch, *Holland* 3649 (BOL), ex hort. Kirstenbosch. September 1933.

CAPE.—Aliwal North: Ruigtefontein, *Thode* A1869 (K, PRE); Stormberg, Buffelvallei am Gariëp, *Zeijher* (S). Barkly West: Blesmanspos, *Acocks* 2489 (K, PRE); Holpan, *Acocks* 2458 (PRE); Wolfontein, *Acocks* 699 (PRE). Cathcart: Cathcart, *Bokelmann* (NBG); *Edmonds & Rogers* 12845 (Z). Cradock: Glen Olivier, Fish River Station, *Hallier* NBG 203/50 (NBG). De Aar: De Aar, *Acocks* 619 (PRE). East London: Macleanstown, *Batten* (NBG); Gonubie, *Dyer* 2038 (K, PRE, GRA). George: Karoo on road to Oudtshoorn, 17 km from Doorn River, *Fourcade* 4732 (BOL); Keurbooms River on road to Klip River, *Fourcade* 4691 (K). Graaff-Reinet: hills near Graaff-Reinet, *Bolus* 408 (K, BOL); Sneeuwerge, *Drège* 8417b (K, S). Hanover: Noupoot, *Rogers* 12091 (BOL). Hay: Kalkveld at Walker, *Acocks* 2419 (PRE). Herbert: near Douglas, *Orpen* (SAM 21441); St. Clair, *Anderson* 757 (BOL). Humansdorp: Humansdorp, *Loubser* 878 (NBG); between Kabeljous River and Gamtoos River, *Drège* 8417a (P, G, S). Kimberley: Wimbledon Farm near Kimberley, *Badenhorst* 62 (PRE); banks of Vaal River, near Shaw's Drift, *Hafström & Acocks* 2489 (PRE). King William's Town: near King William's Town, *Tyson* 2215 (PRE, SAM), *HAA* 840 (BOL, Z, K, BM, GRA, P, G, SAM, UPS), *Leighton* (BOL 27529), *Flanagan* 2172 (GRA, PRE). Komga: hills about Komga, *Flanagan* 31 (BOL, PRE). Kuruman: Kuruman hills, *Pole Evans* 2494 (PRE), *Esterhuysen* 2390 (BOL); Langeberg, Scremoring, *Acocks* 2276 (PRE). Ladismith: Seven Weeks Poort, *Phillips* (SAM 9264), *Loubser* 2063 (NBG), *Lewis* (BOL 27540), *Pocock* 1019 (BOL), Toorok, floor of deep kloof, *Wurts* 1149 (NBG); Buffelskloof, near Ladismith, *Esterhuysen* 14012 (BOL). Mafeking: between Mafeking and Zeerust, *Hutchinson* 2961 (K); near Mosita, *Brueckner* 426 (PRE). Matatiele: Kenaruss, Cedarville, *Southey* (NBG); Matatiele, *McLoughlin* (BOL 14803); *Jacottet* (Z). Middelburg: Middelburg, *Theron* 347, 755 (PRE); koppies on Bangor Farm, *Bolus* 14074 (BOL); 55 km S. of Middelburg, *Acocks* 15947 (PRE). Oudtshoorn: Oudtshoorn, *Hops* 288 (BOL). Port Elizabeth: Redhouse, *Paterson* 46 (GRA, Z); Port Elizabeth, *Hallack* sub Galpin 3070 (GRA). Prieska: Prieska, *Bryant* 822 (K), 358, 359 (PRE). Prince Albert: near Prince Albert, *Marloth* 10312 (PRE). Queenstown: near Queenstown, *Bokelmann* (NBG), *Galpin* 1561 (B, GRA, L, K, PRE, UPS); Lesseyton Nek, *Galpin* 1753 (PRE). Somerset East: Kommadagga, 48 km E. of Somerset East, *Bayliss* 1575, 1591, 1592 (NBG); Oudekraal Farm, near Somerset East, *Bayliss* 1327 (NBG); near Somerset East, *MacOwan* 1891 (GRA, K) 1871 (Z); Somerset, *Bowker* (K). Stockenström: Seymour, *Scully* 68 (SAM). Stutterheim: Stutterheim Commonage, *Acocks* 496 (PRE). Sutherland: near Sutherland, *du Toit* (BOL). Uitenhage: Despatch, *Holland* 3649 (BOL); Uitenhage, *Harvey* (K). Umzimkulu: Suurburg, *Cooper* 3195 (K, Z), 3196 (K), *Day* (BM). Umtata: Umtata, *Acocks* 23482 (PRE). Uniondale: Georgida, *Fourcade* 4649 (BOL); near Avontuur, *Gillet* 1604 (BOL). Vryburg: Vryburg, *Mogg* 8697, 7998 (CGE), *Henrici* 145 (PRE). Warrenton: Warrenton, *Adams* 82 (Z). Wodehouse: Clanville, near Lady Grey, *Bayliss* 2666 (NBG). Xalanga: Cala, *Pegler* 1614 (BOL).

NATAL.—Dundee: Vant's Drift, 33 km E. of Dundee, *Codd* 6321 (PRE). Estcourt: Mooi River, *Wood* 4033 (K, SAM), s.n. (Z), *Mogg* 3073 (PRE); Griffin's Hill, *Rehmann* 7318 (Z); Noordspruit, near Estcourt, *Acocks* 10707 (PRE); Estcourt, *West* 402 (PRE). Newcastle: near Chalkstown, *Wood* 5343 (Z), 5443 (PRE). Weenen: Weenen, *Wood* s.n. (BM). Without precise locality: *Cooper* 1809 (BOL, K, BM, Z).

LESOTHO.—Mafeteng: Malutsanyane Falls, 2 700 m, *Brooke* 46 (BM). Maseru: Maseru, *Dieterlen* 1026 (PRE). Lcribe: Lcribe, *Dieterlen* 634 (K, P, PRE, SAM); Phutha, *Compton* 21647 (NBG). Quthing: Mount Morosi, 5 km N.E. of village, *Nordenstam* 2067 (NBG). Mokhotlong: Mokhotlong, *Liebenberg* 5688 (PRE), *Dohse* 308 (K); without precise locality: *Cooper* 3317 (K).

ORANGE FREE STATE.—Bethlehem: Golden Gate, Generaalskop, *Roberts* 3081 (PRE). Bloemfontein: University grounds, Bloemfontein, *Wasserfall* 870 (NBG); Hoëvld Farm, *Smith* 4450 (PRE); hills around Bloemfontein, *Page* (BOL 17902); *Potts* 2906 (PRE, P), *Gemmell* 5249 (S), *Smith* 5474 (PRE). Boshof: 56 km E. of Kimberley, *Taylor* (BOL 27528). Fauresmith: Near Fauresmith, *Pont* 1573 (U), *Lam & Meese* 4795 (L); *Marloth* 13106 (PRE), *Smith* 411, 516 (PRE); Clarence, *van Hoepen* in TRV 18226 (PRE). Ficksburg: Ficksburg, *Fowkes* 55 (BOL, NBG). Harrismith: Bestersvlei, near Witzieshoek, *Bolus* s.n. (BOL) *Flanagan* 2038 (SAM, PRE); Witsieshoek, *Junod* in TRV 17463 (PRE); *Harrismith*, *Sankey* 283 (K, BOL), *Wood* 5774 (Z), *Rycroft* 2733 (NBG). Kroonstad: Kroonstad, *Pont* 259 (PRE). Ladybrand: 5 km W.S.W. of Hobhouse, *Acocks* 20799 (PRE). Parys: Parys, *Simpson* 9057 (K). Rouxville: Nuwejaarspruit 8–16 km N.E. of Aliwal North, *Zeijher* (S). Steynsburg: 13 km N.N.W. of Steynsburg, *Sidley* 443 (PRE). Thaba Nchu: Thaba Nchu, *Roberts* 2471 (PRE). Vredfort: Witklipfontein, *Botha* 2 (PRE). Winburg: Winburg Game Reserve, *Zinderen Bakker* 1166 (PRE). Without precise locality: *Cooper* s.n. (BOL), 877 (K, Z).

TRANSVAAL.—Barberton: Berlin, Godwan River Station, *Hofmeyr* 3 (PRE). Belfast: Near Wonderfontein Station, *Bolus* 12352 (BOL, K) (on label Waterberg district). Bethal: between Poster and Trichardsfontein, Trichardt: *Rehmann* 6618 (Z, type of *G. remotifolius*). Bronkhorstspuit: Premier Mine, *Rogers* 25338 (Z); Rayton, *Rogers* 20909 (G). Delmas: between Delmas and Kendal, *Reynolds* 3170 (K). Heidelberg: Heidelberg, *Bornsua* in TRV 12733 (PRE). Johannesburg: koppies N. of Florida, *Brent* 16 (NBG); Johannesburg, *Galpin* 1390 (K, PRE), *Rand* 1171 (BM), *Ommanney* 152 (BM), *Moss* 6244 (BM), *Saunders* (Z). Lichtenburg: Lichtenburg, *Jenkins* in TRV 11477 (PRE). Marico: road to Mafeking, *Thode* A 1504 (PRE); Marico, *Louw* 236 (PRE); Zeerust, *Jenkins* sub TRV 11666 (PRE). Middelburg: Botsabelo, about 13 km N.N.W. of Middelburg, *Schlechter* 4065 (BOL); near Middelburg, *Kässner* 425 (BR), *Wilms* 1430 (BM). Pietersburg: near Pietersburg, *Bolus* s.n. (BOL); The Downs, *Moss* & *Rogers* 321 (BOL). Pilgrim's Rest: Graskop, *L. E. Taylor* 1966 (PRE). Potchefstroom: near Potchefstroom, *Pole Evans* 3116 (PRE). Potgietersrus: near Potgietersrus *Bolus* 11007 (BOL); Mosdene, Naboomspruit, *Galpin* M 333 (PRE). Pretoria: Magaliesberg, Hornsnek, c. 19 km W. of Pretoria, *Schlieben* 7854 (B, Z); Silverton, *Brown* sub PRE 27996 (K, NBG, PRE, UPS); 24 km S.E. of Pretoria, *Codd* 2581 (PRE); Rietvlei, *Pole Evans* 1040 (PRE), *Acoks* 11314 (PRE); Hartbeespoort Dam, *Fairall* 1615 (NBG). Rustenburg: 35 km W. of Rustenburg, *Leistner* 543 (NBG, K, PRE); between Magaliesberg and Rustenburg, *Schlotfeldt* (NBG); Rustenburg, *Nation* 141 (K), *Rogers* 1872 (Z, PRE), *Louw* 2582 (PRE). Vereeniging: Vereeniging, *Burt Davy* sub PRE 15184, 17106 (K). Volksrust: Volksrust, *Galpin* 11795 (PRE); 24 km N.W. of Volksrust, *Codd* & *Dyer* 6288 (PRE). Waterberg: near Vaalwater on road to Hermanusdoores, *Meeuse* & *Strey* 10417 (PRE). Witbank: Witbank, *Rand* 153 (BM); 13 km S.E. of Witbank on road to Bethal, *Codd* 3674 (PRE). Wolmaransstad: Strydpoort, *Sutton* 195 (K, PRE), *Rehmann* 5391 (Z). Wolmaransstad, *Liebenberg* 2985 (PRE).

SWAZILAND.—Mbabane: Bomon Ridge, *Karsten* (NBG, PRE). Stegi: 27 km S. of Stegi, *Compton* 30385 (NBG, PRE).

SOUTH WEST AFRICA.—Windhoek: 43 km S.W. of Windhoek, *De Winter* 2570 (K, PRE); between Omaruru & Okahandja, *Liebenberg* 5048 (B, PRE); Okaujimane, *Dinter* 3407 (SAM); Eahero, *Dinter* 3407 (SAM); Gaub-Nossob, *Dinter* 2923 (SAM); 13 km S. of Kapps Farm, *Wilman* 419 (BOL); Grootfontein, *Schoenfelder* S632 (PRE), *Schinz* 413 (K, Z); Lichtenstein, *Dinter* 4433 (B, S, Z, PRE); Auro (Otavi), *Dinter* 5563 (Z).

Burchell, who was one of the first Europeans to reach Litakun (now Kuruman), informs us that the corns of this *Gladiolus*, called *lituin* or *lituing* by the natives, were slightly roasted and then had a sweet and agreeable taste much like that of chestnuts. Phillips notes that the vernacular name in Lesotho was *Khahila e nyenyane*, meaning the small thing that pleases.

The concept of the species as adopted here is a broad one but it must be stressed that, except for changes of a relative character in the perianth, the vegetative parts, capsules and seeds are similar in all three taxa. The differences in the perianth are the absence of well-developed claws in ssp. *wilsonii* and a lengthening of the tips of the lobes in ssp. *edulis*, the ssp. *permeabilis* taking up an intermediate position.

If one were to suggest a line of evolution, it would be to accept ssp. *permeabilis* as nearest to ancestral stock with ssp. *wilsonii* evolving possibly a retarded perianth, becoming caespitose and extending its area further northwards. On the other hand ssp. *edulis* developed long apices to its lobes and, being extremely adaptable, invaded nearly the whole of southern Africa.

42. **Gladiolus vernus** Oberm., sp. nov., affinis *G. rufomarginato*, sed foliis libris 4 distichis, rhachidibus glabris, bracteis oblongis arcte nervosis non rubromarginatis, perianthio rosco non maculato differt.

Planta c. 80 cm alta. *Cormus* depresso-globosus c. 2–4 cm diam. tunicis fibrosis. *Folia* basalia c. 4 disticha libra, ad 80 cm longa 2–3 mm lata sclerotica costis et marginibus prominentibus flavis. *Spica* 18–23 flora. *Bracteae* oblongae c. 15 mm longae acutae crebre nervosae. *Flos* bilabiatus lobis unguiculatis.



FIG. 26. Type of *G. vernus* Oberm. (PRE).

Photo: National Herbarium, Pretoria.

Type: Transvaal, Pilgrim's Rest: Blyde River Canyon lookout-post, 10 km N. of potholes at Bourke's Luck, grassveld, sandy loam over sandstone, *Leistner, Thom & Gillham* 3314 (PRE, holo, NBG, K). (Fig. 26.)

Corms depresso-globose, 2–4 cm in diam., covered with soft fairly coarse matted brownish fibres, forming side corms and a few cormlets as large as peas. *Leaves* with 2 long basal prophylls and 4 free distichous, subterete, subulate, grooved yellowish scleroid leaves about 80 cm long and 2 mm wide; upper cauline 2–3, much reduced, linear, sheathing, acute, finely ribbed. *Spike* about as long as the leaves, erect, straight, *c.* 20-flowered with the flowering part 20–25 cm long, secund or distichous, scape firm, terete, glabrous. *Bract* oblong, *c.* 15 mm long, slightly accrescent, apex apiculate, membranous, pale, closely and finely ribbed with thin reddish veins; bracteole somewhat smaller with the apex entire. *Flowers* small, about 3 cm long, bilabiate, porrect, pale magenta pink, 'dirty pink' or mauve with the lower side-lobes bearing a yellow blotch edged with red. *Perianth tube* narrow, 1 cm long; upper central lobe 2 cm long, broadly clawed, with the ovate apiculate blade arched over the stamens and style; upper side-lobes spreading, rhomboid-spathulate, unguiculate, 15 mm long and broad, apiculate; 3 lower lobes more or less similar, but much smaller, spathulate, apiculate, with free claws, the laterals placed above the lowest and with a central yellow blotch edged with red. *Stamens* with the filaments inserted near the throat, broadened and decurrent below. *Ovary* 4 mm. *Capsule* oblongo-ellipsoid, chartaceous, 12 mm long; *seeds* rounded, 7 mm long, golden brown, broadly winged.

Endemic to the eastern Transvaal, flowering in spring.

TRANSVAAL.—Middelburg: near Botsabelo, 13 km N. of Middelburg, *Mauve* 4117 (PRE). Pietersburg: Wolkberg, Iron Crown Mountains, *S. Thompson* s.n. (PRE). Pilgrim's Rest: Blyde River Canyon lookout-post, *Leistner, Thom & Gillham* 3314, *McNeil* s.n. (PRE); Blyde River hills, *Rauh & Schlieben* 9683 (PRE).

A montane species apparently endemic to the eastern Transvaal at altitudes of 2–3 000 m, inhabiting rock fissures in grassy open bushveld, flowering in early spring but apparently only after rains. Mr P. G. McNeil believes it may flower intermittently throughout the year when circumstances are favourable.

It is a distinct species, distantly related to *G. rufomarginatus*, but the flowers are not spotted, the rhachis is not minutely pubescent and the spathes are not edged with red, but closely and finely veined. It also bears about four distichous leaves, not three, which are rosulate, and the flowers are more laxly spaced. It can be distinguished from *G. pretoriensis*, which does not occur so far east, by its larger size, the striate bracts and the seeds which have well-developed wings.

43. **Gladiolus pretoriensis** Kuntze, Rev. Gen. 3, 2 : 308 (1898). Type: Transvaal, Pretoria, *Kuntze* (NY, holo., K, PRE, photo.).

Corm ovoid, up to 2.5 cm in diam. with tunics of brown moderately coarse, parallel fibres, often produced into a neck and forming 2–3 brown prophylls.

Basal leaf free from near the base, about as long as the spike, up to 50 cm long, terete or subterete, broadly H-shaped in cross-section, with a thick raised midrib and margins, 1–2 mm wide, wiry, upper 4 leaves sheathing the spike, reduced, ending in subulate points. *Spike* straight, slender, wiry, occasionally with a secondary branch near the base, usually about 4–9-flowered, secund, rhachis somewhat flexuose, with the bracts imbricate, oblong-lanceolate, 14 mm long, apiculate, purplish-brown, membranous, closely veined; bracteole similar, bidentate. *Perianth* bilabiate, porrect, prognathous, about 3 cm long, dull purple or pink, the lower side lobes with a yellow ‘eye’ outlined with purple, the others with a dark midrib; tube thin, about 1 cm long, funnel-shaped; upper lobes slightly hooded, central obovate, about 17 mm long, the upper laterals somewhat smaller; the lower projecting forward with the clawed basal parts fused, the central lobe about twice as broad as the blotched, spathulate side-lobes. *Stamens* with the locules subsagittate. *Capsule* subglobose, triangular, about 6 mm long and wide, subcoriaceous; *seeds* brown 2–3 mm long, irregularly shaped and angled through pressure, with the ridges raised, but not forming a wing.

Occasional in grassveld on stony hills around Pretoria and further west as far as Zeerust, at an altitude of c. 1 200 m, flowering usually from February to March, occasionally late in December or April, depending on the rains.

TRANSVAAL.—Krugersdorp: about 14 km from Krugersdorp on farm Gladysvale, *Rodin* 3958 (K, PRE, S); Pretoria: near Pretoria, *Kuntze* (K, NY), *Schlechter* 4151 (BM, BOL, G, GRA, K, LE, PRE, Z), *Bolus* 11171 (BOL), *Pole Evans* 7 (K, PRE), *Leendertz* 603 (BOL, L, PRE), *Conrath* 580 (Z); Meintjieskop, *Burtt Davy* 3952 (PRE); Waterkloof, *Palmer* (NBG), *Verdoorn* 87 (K, PRE); Hennops River, *Moss* 16201 (BM, BOL, K); slopes of Magaliesberg, *Verdoorn & Dyer* 3401 (K, PRE); Irene, *Lotsy & Goddijn* 1180 (L); 23 km from Pretoria on Hartbeespoort Dam road, *Van der Schijff* 5284 (K); Fountains valley, *Repton* 217 (PRE); *Mauve* 4796 (PRE); Rietvlei, *Acocks* 11249 (PRE); Tierpoort, 24 km E. of Pretoria, *Strey* 2827 (PRE). Zeerust: Zeerust, *Pott* 4406 (PRE), *Thode* A 1505 (PRE).

Kuntze placed *G. pretoriensis* on its own in a new section (? or subgenus) *Heterocolon*—in the Latin diagnosis described as a new section but in a note in German below referred to as a new subgenus—which he placed between *Eugladiolus* and *Hebea*. Kuntze described the tube of his new section as funnel-shaped below and cup-shaped above, but the cup-like part is actually the connate basal area of the lower lobes which may appear to be an extension of the tube in a dried flower. The almost wingless seed is most unusual for a South African species although they occur in some European species. The basal leaf resembles that of *G. gracilis*; in cross-section the raised margins are at right angles to the lamina, which is virtually non-existent. The species may be more common than is realized for it is unobtrusive and easily overlooked in the surrounding grassveld.

44. ***Gladiolus marlothii*** Lewis, sp. nov., *G. mostertiae* affinis sed scapo longiore simplici foliis cruciformibus et floribus majoribus malvinis differet.

Cormus ovoideus vel subgloboseus 1,5–2,5 cm diam. tunicis mollibus in collum fibrosum c. 10 cm longum productis. *Scapus* simplex ad 110 cm longus. *Folia* 4,



FIG. 27. Type of *G. marlothii* Lewis (Marloth 9757 PRE).

Photo: National Herbarium, Pretoria.

linearia erecta imbricata ad basin vaginantia cruciformia margine et costa prominentibus pilosis. *Spica* secunda 5–8 flora. *Bractee* oblongae vel oblongo-lanceolatae acuminatae vel acutae 1,7–2,2 cm longae molles. *Flores* parvi late campanulati bilabiati prognathi malvini lobis inferioribus punctatis. *Perianthii-tubus* brevis; lobi inaequales exteriores interioribus breviores; lobus dorsalis obovatus arcuatus c. 2,5 cm longus; lobi laterales et inferiores unguiculati.

Type: Cape Province, 3220A, Sutherland, Roggeveld N. of Sutherland, farm Driefontein, *Marloth* 9757 (PRE, holo., BOL, STE). (See fig. 27.)

Corm ovoid or subglobose, 1,5–2,5 cm diam., the tunics pale brown, fairly soft, extending up in a fibrous neck about 10 cm long. *Stem* slender, simple, 60–110 cm high, with 2 acute or acuminate basal sheaths 10–30 cm long, usually brown, membranous and partly disintegrated. *Leaves* 4, erect, imbricate, sheathing stem to base of spike, the lowest with a long sheath and long linear blade, sometimes overtopping the spike, 2–4 mm wide, more or less cruciform in section with prominent stramineous margins and midrib, pilose with long fine patent silky hairs; second leaf similar but shorter and 2 upper with very long sheaths and short subulate or setaceous blades. *Spike* secund, fairly closely 5–8-flowered. *Bract* oblong or broadly-lanceolate, acuminate or acute, 2,2–1,7 cm long; bracteole slightly shorter, submembranous bidentate. *Flowers* small, c. 3,5 cm long, widely campanulate, bilabiate, prognathous, mauve with the lower lobes minutely speckled, faintly scented. *Perianth tube* short, 1 cm long, narrowly funnel-shaped; limb perfect, widely campanulate with the lobes very unequal and the outer shorter than the inner, the dorsal obovate, arcuate or erect, up to 2 cm long; the upper laterals broadly ovate sub-unguiculate, with the lower margins partially fused with the lower laterals; the latter with long slender canaliculate claws and small ovate or rounded blades placed above the lowest rounded, shorter and broader lobe. *Stamens* and *style* arched forwards inside the dorsal lobe and shorter than the latter; anthers c. 9 mm long, shortly sagittate. *Capsule* and *seed* unknown.

Apparently confined to the Roggeveld mountains N. of Sutherland at altitudes 800–1 400 m, flowering from September to October.

CAPE. — Sutherland: Roggeveld, N. of Sutherland, farm Driefontein, *Marloth* 9757 (BOL, PRE, STE); Klipdrif, on steep slope, S. aspect on lower Roggeveld spurs, rare, *Acocks* 17784 (PRE).

This species was first collected in 1920 by the late Dr Rudolph Marloth, in whose honour it is named, and was not found again until 1954 when Mr J. P. H. Acocks collected plants in the same district and recorded that it was rare. Its flowers are very similar in shape to those of *G. mostertiae*, to which it is closely allied, but differ in colouring and are slightly larger, with anthers twice as long. Other characters which distinguish it are the larger corm, with a long fibrous neck extending above, and very much taller unbranched scape enclosed up to the spike within the long sheaths of the leaves. The blades of the lower leaves are somewhat cruciform in section, with the margins and midrib very prominent and straw-coloured, whereas those of *G. mostertiae* are flat and striate with the

margins and two or three veins equally raised, not as conspicuously thickened and pale as those of *G. marlothii*.

45. **Gladiolus mostertiae** L. Bolus in Ann. Bolus Herb. **3** : 142 (1922). Type: Cape, Calvinia district, Cloudskraal near Nieuwoudtville, *Mostert*, NBG 1609/20 (BOL, holo).

Corm globose, 1–2 cm diam., with fairly soft tunics of reddish brown, almost completely connate fibres. *Stem* slender, 15–25 cm high, with 1 or more branches arising near middle or base; basal sheaths 1 or 2, brown or ferruginous, sub-membranous, up to 5.5 cm long. *Leaves* 4–7, pubescent, the 2–4 basal with very short sheaths and linear-lanceolate blades usually reaching top of stem or shortly above, 2–3.5 mm wide, firm, striate, with prominent margins and 2–3 equally prominent nerves; 2–3 cauline 2–5 cm long, with short subulate blades and lower third to half sheathing. *Spike* lax, subsecund, 3–7-flowered. *Bract* oblong, obtuse or lowest sometimes acute, green, 1.4–0.8 cm long; bracteole slightly shorter than bract, bidentate. *Flowers* very small, about 3 cm long, bilabiate, pale pink with blades of lower lateral lobes cream above and yellow or greenish yellow at the base. *Perianth tube* curved, narrowly funnel-shaped, 8–9 mm long; *lobes* unequal, obtuse, apiculate, the dorsal galeate, obovate, 1.8–2 cm long, 1 cm wide; upper laterals somewhat rhomboid-obovate, with half of lower margin connate to claws of lower lobes, 1.4–1.5 cm long, 0.8–1 cm wide; 3 lower projecting forward, unguiculate, with narrow claws connate for 7–9 mm, the lowest with a concave suborbicular or more or less cordate blade 0.8–1 cm long, 8 mm wide, and laterals projecting beyond it, with suborbicular blades 5–7 mm long and wide and claws about 5 mm longer than lowest, the very slender free upper part resting on the lower blade. *Stamens* arcuate, arising near middle of tube; filaments 1.3–1.6 cm long; anthers linear, 4–5 mm long. *Ovary* oblong or ellipsoid, 3–4 mm long; style reaching top of anthers, with narrow spatulate branches about 3 mm long. *Capsule* and *seed* unknown.

Western Cape Province; apparently very local and rare near top of escarpment on western border of Calvinia district, flowering from November to December.

CAPE.—Calvinia: Cloudskraal, near Nieuwoudtville, *Mostert*, NBG 1609/20 (BOL); near Nieuwoudtville, *Buhr* (BOL), *Compton* 1452/26 (BOL), *Theiler* 87 (PRE); top of Van Rhyn's Pass, *Watermeyer*, NBG 276/27 (BOL, K), *Erlank* (BOL, NBG).

A very distinct and apparently rare species recorded only a few times from the vicinity of Nieuwoudtville in the Calvinia district. In November 1962, the flowering month for this species, Lewis spent four days searching for it in that area and visited the type locality but did not find a single plant. It is possible that it appears only after exceptionally good rains and 1962 was an average 'dry' season on the western escarpment of the Calvinia district.

Dr L. Bolus described it from a plant which flowered in the National Botanic





Gardens, Kirstenbosch. It is readily distinguished by the pubescent leaves, colour of the perianth, concave anticus segment and other characters. Its very small pink flowers, with a prognathous lower lip and the margins of the upper side-lobes partly joined to the narrow united claws of the lower lobes, are very similar to those of *G. vernus*, and it clearly belongs in the same small group characterized by this type of flower.

46. ***Gladiolus rufomarginatus*** Lewis, nom. nov.

G. marginatus Bol. f. in Ann. Bolus Herb. 2 : 108 (1917); non L.f. (1781). Type: Transvaal, near Lydenburg, Wilms sub TRV 6457 (PRE, holo.).

Corm ovoid, about 2,8 cm diam., with tunics of slightly coarse brown fibres extending up in a neck about 7,5 cm long. *Stem* slender, simple, straight or subflexuose, about 50 cm high, with 2 basal sheaths 10–12 and 15–18 cm long, the outer hyaline, brownish at the apex, and inner green or brownish green. *Leaves* 3–5, the 3 basal erect, extending well above the stem, the lower part subterete and sulcate with the margins and midrib very much thickened, becoming less prominent upwards and the upper part flat, linear, 2–2,5 mm wide; cauline leaves 1 or 2, 2,5–8 cm long, the upper sometimes reddish brown and bract-like. *Spike* very dense, secund or subsecund, 20–30-flowered; scape and rachis minutely pubescent. *Bract* submembranous, more or less straw-coloured with narrow reddish brown margins, faintly striate, ovate or oblong-ovate, acuminate or acute, 1,5–1,2 cm long; bracteole similar to bract but slightly shorter and subacute or obscurely bidentate. *Flowers* very small, about 2,5 cm long, bilabiate, the upper lip suberect, densely flecked or spotted with dark red or purple on a white or creamy yellow ground and lower lip deflexed, finely streaked with red or purplish lines and usually edged with bright pink. *Perianth tube* nearly straight, 1 cm long, slightly widened to the throat; *lobes* unguiculate, obtuse or acute, the dorsal elliptic, 1,8–2 cm long, 7–8 mm wide, and upper laterals somewhat rhomboid, 1,4 cm long, 6–7 mm wide; 3 lower connate for about 1,5 mm at the base, 4–5 mm wide, the laterals 9 mm long spatulate, acute, placed above the lowest which is ovate, acuminate, 1,1 cm long. *Stamens* suberect with declinate anthers 5–6 mm long, reaching slightly above middle of dorsal lobe. *Style* reaching middle of anthers, with spatulate conduplicate branches about 2 mm long. *Capsule* and *seed* unknown.

Recorded only from a small area in the eastern Transvaal, north of Lydenburg around the Spekboom River, where it is fairly frequent in grassveld on shaly slopes at an altitude of about 1 600 m, flowering from January to March.

TRANSVAAL.—Lydenburg: near Lydenburg, Wilms 1425 (AMD, BM, G, K, P, Z), 1433 (AMD, BM, G, K, L, P, PRE, Z), Van der Merwe 1308 (PRE); 3 km N. of Lydenburg, Codd & Dyer 7695 (K, PRE); top of Kaus, near Spekboom River bridge, Zeederberg (K, PRE), Galpin 135716 (PRE).

A very distinct species well marked by the dense spike, pale bracts with conspicuous reddish brown margins and small red or purplish spotted flowers. It was named *G. marginatus* by Bolus f. on account of its bracts but as this name

was used by the younger Linnaeus in 1781 for another plant (*G. marginatus* L.f. = *Watsonia marginata* (L.f.) Ker) it has been renamed *G. rufomarginatus*.

47. **Gladiolus orchidiflorus** Andr., Bot. Rep. t.241 (1802); Pers., Syn. **1** : 44 (1805); Bak. in J. Linn. Soc. **16** : 177 (1877), Handb. Irid. 224 (1892), Fl. Cap. **6** : 160 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 222 (1893); Rice & Compton, Wild Flrs Cape of Good Hope t.213, 2 (1951). Type: Bot. Rep. t.241. Introduced from the Cape by Niven.

G. alatus sensu Jacq., Coll. **4** : 165 (1792), Icon. t.259 (1795); sensu Willd., Sp. Pl. **1** : 216 (1797); sensu Vahl, Enum. **2** : 100 (1806) excl. b; sensu Pers., l.c., non L (1762).

G. viperatus Ker in Curtis's bot. Mag. t.688 (1803) et Gen. Irid. 131 (1827) excl. syn.

G. virescens Thunb. et *Sisyrinchium viperatum* Pluk.; Ait., Hort. Kew. ed. 2, **1** : 97 (1810); Spreng., Syst. Veg. **1** : 152 (1825); Sweet, Brit. Fl. Gard. t.156 (1826) et Ornam. Fl. Gard. 4 t.229 (1854); Loudon, Ladies Fl. Gard. Ornam. Bulb. Pl. t.12 (1841); Klatt, Linnaea **32** : 691 (1863) excl. syn. *G. virescens*. Type: Curtis's bot. Mag. t.688 (iconotype).

G. dregei Klatt in Linnaea **32** : 693 (1863); Bak., Handb. Irid. 225 (1892) et Fl. Cap. **6** : 162 (1896). Type: Cape, Kamiesberg, between Pedroskloof and Leliefontein, Drège 2631 (B, hol.).

Hebea alata Eckl., Top. Verz. 42 (1827).

Common name: Groen kalkoentjie.

Corm ovoid to globose, 1–2,5 cm in diam. often deep-seated and with sessile or stoloniferous cormlets, tunics fibrous, reticulate, often hardened. *Leaves* 3–8, variable, short and falcate or straight and grass-like, distichous, clustered, surrounded at the base by 1–2 pale narrow tubular short to long prophylls, linear-lanceolate to linear to filiform, up to 40 cm long and 5 mm wide; midrib and veins somewhat prominent, occasionally minutely hispidulous. *Spike* often branched, geniculate below, the 5–15 second or subsecond flowers evenly spaced, fairly close together, rhachis smooth, terete at an oblique angle to the scape. *Bract* porrect, narrowly lanceolate, 4–1,5 cm long, folded, enveloping bracteole and perianth tube. *Flowers* small, 3–5 cm long, fragrant, bilabiate, in various dull shades of green, grey or beige, usually with a purplish sheen, the median stripe purple, occasionally divided by a yellow central line, the lower laterals yellow or lime-green outlined with purple, or with a purple blotch. *Perianth tube* slender, tubular, curved, widening slightly; lobes very unequal, clawed, dorsal strongly arched, linear, slightly widened towards the rounded apex, 2–3,5 cm long, upper laterals and lowest lobe deltoid-acuminate, spreading; the lower laterals narrowly spatulate, shorter than lowest lobe, spreading recurved. *Stamens* arched and appressed against the dorsal lobe and nearly as long. *Style* finally exerted beyond the dorsal lobe. *Capsule* ellipsoid to suborbicu-

lar, up to 2 cm in diam.; seeds rounded, 4–9 mm in diam. broadly winged, pale brown.

Frequently recorded from the south-western to the western and north-western Cape and south-western Orange Free State, usually in sand, flowering August to October.

COLOUR PLATE 13. STELLA GOWER. *Flower. Pl. Afr.* t.165 (1965). Inflorescence and part of two leaves; 1, plant much reduced; 2, longitudinal section of flower, magnified; 3, corm; 4, bract; 5, stamen \times ; 6, top of style and stigmas \times ; 7, fruit.

Cape.—Corm from Vanrhynsdorp ex hort. Irene, Pretoria (PRE 2858). August 1924.

Cape.—Barkly West: Windsorton, *Cooke* (McGregor Mus. 6698, BOL). Bellville: Milnerton, *Botha* (SAM 60873). Killarney, *Loubser* 978 (NBG); Lagsche unter den Tigerbergen *Ecklon* (S). Calvinia: Akkerdam, near Calvinia, *Barker* 9498 (NBG); *Acocks* 17751 (PRE); Roggeveld, Fransplaas Farm, *Marloth* 9888 (PRE). Carnarvon: Jasperskop, about 32 km N. of Vanwyksvlei, *Stayner* (NBG). Ceres: 16 km N.W. of Karooport, *Levy* (NBG). Clanwilliam: Otterdam, *Compton* 24163 (NBG); Bidou River valley, *Leipoldt* 3054 (BOL); Olifants River valley, between Citrusdal and Clanwilliam, *Barnard* s.n. (NBG); Hopefield: Saldanha Bay, *O'Connor Fenton* (NBG); Steenberg cove, *Lewis* 5987 (NBG). Kimberley: Valrena, 32 km S.S.W. of Schmidtsdrift, red sand, *Leistner* 2872 (PRE); 9 km N.E. of Kimberley on Samaria road, *Leistner* 2874 (PRE). Laingsburg: Whitehill Karoo, *Compton* 17395 (NBG); N. end of Seven Weeks Poort, *Lewis* (BOL 27521). Malmesbury: near Mamre, *L. Bolus* (BOL 27522). Namaqualand: *Scully* 95 (PRE); between Springbok and Steinkopf, *Schlieben* 9146 (PRE); Concordia, *Schlechter* 11344 (AMD, B, BM, BOL, GRA, K, Z); near Kookfontein, *Bolus* 6626 (BOL, K, SAM); Kamiesberg, *Pearson* 5770 (K); near Kamieskroon, *Esterhuysen* 5972 (BOL) *Lewis* 5477 (NBG). Piketberg: 3 km E. of Velddrif, *Lewis* 5996 (NBG); Het Kruis, *Stephens & Glover* 8619 (K, BM). Prieska: sand dunes near Orange River at Kliphuis, *Bryant* J. 327 (P, PRE); Prieska, *Bryant* 358 (PRE). Robertson: Robertson, *Marcus* NBG 1994/34 (BOL). Vanrhynsdorp: Vanrhynsdorp, *Rood* (PRE), *Marloth* 7543 (PRE); Soutrivier, *Schlechter* 8314 (BM, BOL, G, GRA, GRO, K, P, PRE, Z); Urions Kraal, *Barker* 8593 (NBG). Worcester: Pokkraal, near Brandvlei, *Walters* s.n. (NBG); between Osplaats and Tunnel Siding, *Rogers* 16742 (Z).

ORANGE FREE STATE.—Fauresmith: Koksfontein, *Pont* sub *Henrici* 2817 (PRE); klein Gryskop (No. 445) *Smith* 521 (PRE).

WITHOUT LOCALITY: Oldenburg (BM), *Burchell*, B148 (K); *Thom* (K); *Ecklon & Zeyher*, 76 (Z, UPS), 138 (G, LD but locality (2,9) not correct).

Writing of this species in 1803, Ker described the flowers as 'exquisitely fragrant with a scent of the perfume called Eau de Miel, or, as it appears to others, of Balm, of a greenish grey colour with something of a livid hue and brown stripes'. The flowers are in various shades of dull green, as described above, usually with a purplish sheen or bloom which sometimes is so pronounced that the flowers appear purple rather than greenish, especially in a dull light. This is true of the plant figured in Andrews's *Botanists Repository* in 1802, the type of the species, which according to the author was introduced by Niven the previous year.

A better illustration of a more typical plant was published a few years earlier by Jacquin in his *Icones* t.259 (1795) where it was named *G. alatus*. In a note under *G. alatus* on page 164 the confusion between that species and *G. orchidiflorus* is mentioned, and the reason for the name *G. viperatus* being given to it by Ker.

In the northern area of its distribution the corm becomes deep-seated in the sand forming a long neck, a well-known adaptation to a hot dry habitat. Lewis preferred to retain *G. dregei* as a separate, although closely related, northerly

species but it appears to be merely an ecospecies adapted to a warmer and drier climate.

The typical tall form from the south-western Sandveld produces annually a great number of small cormlets mostly round the base of the corm with some inside the corm tunics. According to observations by Professor T. T. Barnard on plants in cultivation the external cormlets if removed and sown separately will start growing at once the first season but those removed from inside the corm tunics invariably remained dormant until the second year.

48. **Gladiolus watermeyerii** L. Bol. in S. Afr. Gdng & Ctry Life **17** : 294 (1927). Type: Cape, Calvinia district, near Nieuwoudtville, *Marloth* 5569 (BOL, holo., PRE).

Corm globose or depressed-globose, 1–2 cm diam., with soft more or less membranous brown or reddish brown tunics. *Stem* slender to somewhat stoutish, flexuose, the upper half often declinate, 10–40 cm long, occasionally branched, with a single basal sheath 4–10 cm long, usually colourless, obtuse and mucronulate. *Leaves* 4 (rarely 3), the lowest erect or subfalcate, usually much longer than the others, up to 44 cm long, 0.2–1.1 cm wide, $\frac{1}{4}$ sheathing, the blade linear, lanceolate or ensiform, firm and striate with 2–several equally prominent hispidulous veins; second and third leaves smaller, erect, and uppermost bract-like, 3.5–8.5 cm long, involute, usually with narrow red margins. *Spike* secund, 2–6-flowered (rarely 1). *Bract* navicular, oblong, obtuse or acute, 3–6 cm long, 1–1.4 cm wide, with narrow red margins; bracteole similar to bract but slightly smaller and usually bidentate. *Flowers* fragrant, bilabiate, the upper lobes cream or greenish cream flushed with dull purple or pinkish purple and the spreading laterals conspicuously veined, the lower lobes lime-green or orange-green tipped with cream. *Perianth tube* not exerted from bract, curved 1.2–1.4 cm long; *lobes* very unequal, all acute, the dorsal arcuate, more or less oblong, tapering slightly to base and apex, 2.6–3.5 cm long, 1–1.4 cm wide; upper laterals and lowest ovate or ovate-deltoid, shortly unguiculate, the 2 upper patent, 2–2.5 cm long, 1.4–2.2 cm wide, and lowest deflexed, 2.2–2.8 cm long, 1–1.8 cm wide; 3 lower connate for 3–4 mm, the laterals spatulate, 2–2.8 cm long, 4–5 mm wide, with small pale raised ridges on the margins at the base of the claw. *Stamens* arcuate, arising 4–6 mm from top of tube; filaments 1.8–2.2 cm long; anthers linear, subsagittate, 0.9–1.1 cm long. *Ovary* ellipsoid, 7–9 mm long; style reaching to middle or top of anthers, the branches 6–7 mm long, conduplicate, slender and purplish below with small pale obcordate stigmas.

Locally common around Nieuwoudtville in the western Cape in sandy soil amongst Proteaceae; occasional elsewhere, flowering end of July to September.

FIG. 28. From a painting by G. J. Lewis.—Inflorescence and leaves; corm; flower laid out; top of style and stigmas $\times 2$; stamen, $\times 2$; bract and bracteole. Cape.—Calvinia, near Nieuwoudtville, *Lewis* 5729 (NBG). August 1962.



FIG. 28. *G. watermeyeri*.

CAPE. — Calvinia: near Nieuwoudtville, *Marloth* 5569 (PRE, BOL), *Watermeyer* sub BOL 19895 (BOL, K), *Uys* (BOL 20488, SAM). *Herre* sub Stell. Un. Gdns. 37 (BOL), *Buhr* sub NBG 1406/35 (NBG); Glenridge Farm, near Nieuwoudtville, *Lewis* 5729, 5890 (NBG); Lokenburg, *Acocks* 18932 (PRE); top of Van Rhy'n's Pass, *Lewis* 5893 (NBG); top of Botterkloof Pass, *Maguire* 184 (NBG), *Stokoe* (SAM 60164); Wupperthal, *Drège* 2630 (G.P.). Clanwilliam: Lamm Kraal (Lang Kraal? c. 12 km from Brandewyn River) *Schlechter* 10845 (B). Between Brandewyn and Doorn rivers, *Lewis* 2309 (SAM). Without locality: *Forsyth* (K).

G. watermeyeri is very closely allied to *G. alatus* and distinguished mainly by the colour and scent of the flowers and the more or less translucent dorsal perianth lobe being slightly narrower, tapering a little to the apex and remaining arched when the flower is fully open. Although the colour of the flowers is not particularly attractive, the scent is delightful, rather like violets, and so strong in the field that the plants can often be located by their scent.

49. **Gladiolus virescens** Thunb., Fl. Cap. 196 (1811). Type: Cape, *Thunberg* 1090a (UPS, holo.). (See fig. 29.)

Common name: Geel Kalkoentjie.

Corm subglobose, 0,8–1,5 cm diam., usually with 1 to several very small cormels at the base, the tunics thin, brown, submembranous. *Stem* slender or moderately slender, occasionally branched, 10–30 cm long, flexuose, the upper half often decinate, with a single hyaline obtuse sheath 2–10 cm long at the base. *Leaves* 3, the lowest 20–60 cm long with a short striate pubescent or glabrous sheath and long spreading blade either linear, 1,5–3 mm wide, with very prominent margins and midrib, or subterete to terete and sulcate, glabrous or more or less hispidulous on the nerves; 2 upper leaves much shorter, 5,5–10 cm and 2,5–7 cm long, separated by a short to long internode, pubescent or puberulous with short striate sheaths and linear or subulate blades. *Spike* secund, 2–7-flowered, occasionally only 1. *Bract* ovate, oblong or oblong-lanceolate, acute or obtuse, often subnavicular, 3–1,6 cm long; bracteole ovate-oblong or oblong, 2,8–1,2 cm long, distinctly or minutely bidentate. *Flowers* fragrant or inodorous, bilabiate, generally dull or greenish yellow with a brighter patch in lower half of lower lobes and usually with more or less conspicuous dull purplish, mauve or brownish veining on the upper lobes and sometimes the tips of the lower, or in colours ranging from white, grey, cream, pink or mauve with distinctly darker veins. *Perianth tube* 1–1,3 cm long, cylindrical nearly to the top then slightly expanded and curved; *lobes* very unequal, the dorsal at first arcuate but soon becoming erect, spatulate, acute or subacute, rarely obtuse, 3–4 cm long, the claw 1,5–2 cm long, 3–5 mm wide, and blade 1–1,8 cm wide; upper laterals patent with recurved tips, 1,9–2,7 cm long, ovate or ovate-deltoid above a short claw, acute or acuminate, 1,4–2,2 cm wide; 3 lower deflexed, 2,2–2,8 cm long, the claws connate for 4–6 mm with small papillate ridges on the margins at the base, the lowest like upper laterals but smaller, 0,8–1,5 cm wide, and laterals spatulate, acute or acuminate, with slender claws 1,2–1,5 cm long and blades 6–9 mm wide. *Stamens* arcuate, arising near top of tube; filaments 1,8–2,2 cm long; anthers

linear, subsagittate, 6–9 mm long. *Ovary* ellipsoid, 5–7 mm long; style reaching to middle of anthers, the branches 5–7 mm long, linear with small obcordate conduplicate stigmas. *Capsule* ellipsoid, pallid, thin-walled, 1.5–2 cm long; *seeds* suborbicular, broadly winged, yellow-brown, 7–8 mm long.

Widely distributed in the Cape winter-rainfall region from Ceres and Worcester to Laingsburg, and along the coast from Caledon to Port Elizabeth, occasional in sandy valleys and on hillslopes, flowering from August to October.

Three varieties are recognized.

KEY TO VARIETIES

Sheathing part of leaves pubescent; flowers scented:

Flowers dull to bright yellow or greenish yellow; recorded from the Ceres, Worcester, Laingsburg and Caledon districts (a) var. *virescens*

Flowers grey, cream pink or mauve, usually smaller but more numerous; recorded from Caledon to Port Elizabeth along the coast (b) var. *lepidus*

Sheathing part of leaves glabrous; flowers not scented, white or pale pink with darker pink veining; recorded from around Brandvlei near Worcester (c) var. *roseo-venosus*.

(a) var. *virescens*

G. virescens Thunb., Fl. Cap. 196 (1811) ed. Schultes **48** (1823); N.E. Br. in J. Linn. Soc. **48** : 33 (1928). Type: Cape, *Thunberg* 1090a (UPS, holo.).

G. luridus Hornem., Hort. Hafn. Suppl. 113 (1819). Type: without locality or collector (C, holo.). *G. bicolor* Eckl. ex Bak. in J. Linn. Soc. **16** : 178 (1877), Handb. Irid., 224 (1892), Fl. Cap. **6** : 161 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893); non Thunb. 1784. Type: Cape, Caledon, *Ecklon* (or Beil & Ludwig ?, S, holo.). *G. luteus* Klatt in Linnaea **32** : 694 (1863); non Lam. 1786. Type: Cape, Caledon district, *Ecklon* & *Zeyher* 135 (C, holo, BR, LD, P, PRE, UPS, Z). *G. templemanii* Klatt in Trans. S. Afr. phil. Soc. **3** : 196 (1885); Dur. & Schinz, l.c. 225. Type: Cape, Caledon district, Swartberg near Hot-spring, *Templeman* in herb. MacOwan 2608 (SAM, holo., BM, BOL, K, S).

Hebea bicolor Eckl., Top. Verz. 42 (1827) nom. nud.

In his account of the Iridaceae of Thunberg's Herbarium the late Dr N. E. Brown made the following statement about *G. virescens*: 'Two sheets: *a* is *G. virescens* Thunb. (1811). *G. bicolor* Baker (1877). The two specimens on the sheet both belong to one species, and neither of them is *G. formosus* Klatt nor *G. viperatus* Ker, as named by Klatt. It is distinct from *G. orchidiflorus* Andr., under which Baker has placed it as a synonym, being identical with the plant he describes under the name *G. bicolor*. As it is evident that Thunberg's description of *G. virescens* was made from the specimens on sheet *a*, they must be taken as the type of the species and Thunberg's name retained. *b* is *G. pulchellus* Klatt.' (J. Linn. Soc. **48** : 33 1928).

When Lewis examined Thunberg's Iridaceae in 1949, and again in 1965, she agreed with Dr Brown's identification of this species. Unfortunately Thunberg's specimens are not localized but they are well preserved and are identical with some of the collections cited above from the Ceres and Worcester



districts, for the lobes taper to acuminate tips, much more acuminate than in the Caledon form with which N. E. Brown says it is identical. Since we know that Thunberg passed through these areas on his travels during the period when this species would be flowering, it is more than likely that he collected his plants somewhere there, and not in the Caledon district which he visited some considerable time after the flowering period.

The form in the Caledon district, named *G. bicolor* by Baker and *G. templemanii* by Klatt (the former name is not legitimate as it had been used before by Thunberg for a different plant), differs slightly from the more northern form in having flowers of a brighter yellow, in some cases even orange-yellow, with little or no veining on the upper lobes, and the dorsal lobe occasionally rounded at the apex instead of acute. However it has been found that they vary from one locality to the next and although on the whole they are brighter and more attractive, I do not consider that this form is sufficiently distinct to be treated as a variety.

On sandy flats at the eastern end of Dutoitskloof in the Worcester district *G. virescens* and *G. alatus* occur together, and a few hybrids have been found among them. These are mentioned and cited under *G. alatus*.

COLOUR PLATE 14. G. J. LEWIS.—Inflorescence; corm and basal leaf; flower laid out; bract and bracteole.

Cape.—Worcester: bottom of Dutoitskloof. (NBG 67956). September 1962.

CAPE.—Caledon: Zwischen Caledons Bad und Bredekampsplatz am Steenbrasrivier, 2 Oct. 1826, Ecklon (or Beil & Ludwig?, S—type of *Hebea bicolor*); Swartberg, near hot spring, *Templeman* in herb. MacOwan 2608 (BM, BOL, K, S, SAM—type of *G. templemanii*), Ecklon & Zeyher 135 (C—type of *G. luteus* Klatt), 135 and s.n. (BR, L, LD, PRE, P, UPS, Z); Caledon, Marloth 7054, Loubser 395 (BOL), Barnard (SAM 50427), Prior (K), Moyle Rogers (K), Zeyher (K); near Shaw's Pass, Gillett 4440 b (BOL), Thomas (NBG); Hermanus, Schur (NBG); Bot River, Rust (NBG); Caledon—Villiersdorp road, Barker 25 (BOL, K); 16 km from Genadendal, Johns (NBG); 9 km W. of Riviersonderend, Lewis 5563 (NBG). Ceres: Gydow, Leipoldt 4068 (BOL); between Karooport and Ceres, Dymond (BOL 27535); Hottentotskloof, Barker 3022 (NGB). Laingsburg: Witteberg valley, 1 150 m, Compton 3560 (BOL, K). Worcester: eastern end of Dutoitskloof, Lewis 6044 (NBG), Jackson (NBG), Walters (NBG); Pokkraal, near Breede River Bridge on Rawsonville road, Walters (NBG).

WITHOUT LOCALITY: *Thunberg* 1090 UPS, Ceres Wild Flower Show, comm. Lewis sub BOL 20404 (BOL, K) Lewis 1999 (SAM); Caledon Wild Flower Show (BOL 14789); hort. Hafn. (C—type of *G. luridus*).

(b) var. **lepidus** Lewis, nom. et stat. nov.

G. pulchellus Eckl. ex Klatt in *Linnaea* **32** : 693 (1863); Bak., Handb. Irid **224** (1892), Fl. Cap. **6** : 160 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 223 (1893) excl. syn. *Hebea zeyheri*, non Salisb. 1796. Type: Cape Swellendam area, Ecklon & Zeyher 137 (B, holo.).

Hebea pulchella Eckl. ms.

Differs from var. *virescens* in having the bracts and flowers usually slightly or distinctly smaller, sometimes only half as large, often more numerous and up to 11 to a spike, the bracts usually obtuse with narrow hyaline margins the sweet-scented flowers varying in colour from greyish or cream to mauve, pink or brownish pink, with mauve, purplish or deep maroon veins on the upper

lobes and tips of the lower, and a yellow or greenish patch in the middle of the lower lobes.

Recorded from Caledon to Port Elizabeth, occasional on sandy flats and hills, flowering from September to November.

CAPE.—Bredasdorp: Soetendalsvlei (Zoutendahlsvlei), *Ecklon* (S); De Hoop, *Martin* 1192 (NBG); Struis Bay, *Leipoldt* 3591 (BOL); 3–13 km E. of Elim on Bredasdorp road, *Taylor* 4309 (NBG); between Elim and Baardskeerdersbos, *Thomas* (NBG). Caledon: near Riviersonderend, *Galpin* 4728 (BOL, GRA). Humansdorp: Kouga River, *Fourcade* 3099 (BOL); between Kabeljousrivier and Gamtoos River, *Drège* 8415 (BM, G, K, L, P, S); Gamtoos River, Assegaibos, *Fries, Norlindh & Weimarck* 1285 (LD). Knysna: Avontuur—Knysna, *Fries, Norlindh & Weimarck* 1652 (LD). Mossel Bay: Cloete's Pass 4 000 m, *Muir*, BOL 15035 (BOL, GRA, K); Mossel Bay, *Barker* 8201 (NBG). Port Elizabeth: Van Stadens, *Hallack* sub *Galpin* 154 (PRE). Riversdale. Albertinia, *Muir* (BOL 14817); 27 km W. of Albertinia, *Lewis* 5677 (NBG); Platbos, near Albertinia, *Muir* 1049 (BOL, PRE). Swellendam: Swellendam, *Ecklon & Zeyher* 137 (B, G, PRE, S—type of *G. pulchellus*, s.n. Z), *Martin* 625 (NBG); *Marloth* 6563 (PRE); Buffeljags River between Swellendam and Rietkuil, *Zeyher* 3994 (GRA, P, S, SAM, Z), *Ecklon & Zeyher* (LD, P, S); 1.5 km E. of Buffelsjags River, *Salter* 6301 (BOL); Riviersonderend, *Galpin* 4728 (PRE); near Appelskraal by Riviersonderend, *Zeyher* 3994 (K, S); Suurbrak road, *Wightman* (SAM 67318); Stormsvlei, *Penther* 582 (Z); Infanta, *Walgate* 871 (PRE, SAM); mountains near Puspasvlei, Voormansbos & Duiwelsbos, *Ecklon & Zeyher* (C, L, LD, UPS, PRE).

WITHOUT LOCALITY: *Thunberg* (UPS—*G. virescens*, sheet 1091, b, S); *Sparman* (UPS, S); *Bowie* 27 (BM).

Although Klatt and Baker treated this as a separate species there is no character by which it can be distinguished from *G. virescens* apart from the colouring of the flowers and the fact that the bracts and flowers are usually slightly smaller, though the size is variable and they may sometimes be as large or occasionally even larger, as for example in plants collected in the Humansdorp district by Fries, Norlindh and Weimarck (no. 1285). There is no difference in the structure or texture of the corm and its tunics, leaves or flowers, and it cannot be regarded as other than a variety of *G. virescens*. In distribution it is more southerly, extending along the coastal districts from Bredasdorp to Humansdorp and varying somewhat in colouring in different areas. A form near Elim in the Bredasdorp district has the second leaf considerably longer than usual, sometimes up to 25 cm or even slightly more.

Plants collected by Ecklon and Zeyher were distributed by them under Ecklon's MS. name, *Hebea pulchella*, but although Durand and Schinz cited p. 42 in Ecklon's *Topographisches Verzeichniss* the name was not published in that work. In 1863 Klatt adopted Ecklon's specific epithet when he described *Gladiolus pulchellus*, but this name is illegitimate as it had been used by Salisbury in 1796 for a different plant. The type, *Ecklon & Zeyher* 137, is in the Berlin-Dahlem Herbarium, but their no. 146, mounted on the same sheet and cited as *G. pulchellus* by Klatt, is *G. permeabilis* Delaroché.

Hybrids between var. *lepidus* and *G. alatus* have been recorded from Bredasdorp district and are almost identical with hybrids produced by var. *virescens* and *G. alatus*.

(c) var. **roseo-venosus** Lewis var. nov., var. typica, a foliorum parte yaginantibus glabra floribus inodoris albis vel pallide roseis roseo-venosis differt; circum Brandvlei prope Worcester habitat. Type: Cape, Worcester district, Kweekkraal, *Bayliss* 642 (NBG, holo.).

This variety differs from var. *virescens* and var. *lepidus* in having the sheathing part of the leaves glabrous but the subterete blade more or less hispidulous near the base on the nerves, and flowers without scent, white or pale creamy-pink with pale to deep pink veining.

Stem 19–40 cm high. *Spike* 3–9-flowered. *Bract* oblong obtuse, or subobtusate 3–1,4 cm long, with hyaline margins. *Perianth tube* 1–1,5 cm long: dorsal lobe 3–3,8 cm long, up to 2 cm wide, and upper laterals 2,3–3,3 cm long, up to 2,4 cm wide. *Capsule* ellipsoid, 1,8–3 cm long; *seeds* suborbicular, reddish brown, 5–7 mm diam.

Although the flowers have no scent they are the most attractive of the three varieties. The plants are somewhat variable in size but on the whole are taller than the other varieties and the flowers are often larger than in var. *virescens*.

Recorded only from the Worcester district in the Cape, common locally on sandy flats in vicinity of Brandvlei, flowering in September.

CAPE.—Worcester: Kweekkraal near Brandvlei, Bayliss 642 (NBG); near Brandvlei, Walters s.n. (NBG), 1021 (K, PRE); Doorn River, Keyter (STE) 10681). Without precise locality: Du Plessis (NBG).

50. ***Gladiolus ceresianus*** L. Bol. in S. Afr. Gdng & Ctry Life **21** : 367, 369. Type: Cape, Ceres district, Compton in herb. Bolus 19883 (BOL, holo., K).

Corm ovoid 1–1,5 cm diam., with thickish somewhat matted brown tunics extending up in a closely sheathing rough irregular neck, 1,5–6,5 cm long, occasionally with pendulous black, fusiform cormlets amongst the neck-scales. *Stem* slender, simple, flexuose, 10–30 or occasionally to 40 cm long, with a single yellowish or brownish obtuse sheath 2–8 cm long at the base (rarely 2). *Leaves* 3, glabrous, shining, with short faintly striate sheaths and firm subterete sulcate spinescent blades, the lowest erect or arcuate, 15–45 cm long, 1–2 mm diam.; 2 upper much shorter, the uppermost partly sheathed by the second with no visible internode between them. *Spike* secund, 1–5-flowered, usually 1–3. *Bract* oblong or oblong-lanceolate, usually acute, subnavicular, 4,2–2,2 cm long; bracteole similar to bract but slightly shorter and minutely bidentate. *Flowers* bilabiate, fragrant, dull yellow or greenish yellow with a brighter patch in lower half of lower lobes, the upper and tips of lower sometimes with more or less conspicuous purplish or brownish plumose veining. *Perianth tube* 1,3–1,7 cm long, curved near the top, the upper half narrowly funnel-shaped; *lobes* very irregular, unguiculate, acuminate or cuspidate, the dorsal soon becoming erect with the blade somewhat recurved, subspathulate, 3,3–4,4 cm long, the claw 4–5 mm wide and blade 1–1,4 cm wide, widening gradually from the claw; upper laterals patent, 2–2,8 cm long, the claw short and blade ovate or ovate-deltoid, 1,1–1,6 cm wide; 3 lower deflexed, 2–2,8 cm long, the claws slender, connate for 2–5 mm with small papillate ridges on the margins at the base, the blade of the lowest more or less ovate-lanceolate, 0,7–1,1 cm wide, and laterals lanceolate, 5–8 mm wide. *Stamens* arcuate, arising 2–4 mm from top of tube; filaments 2–2,3 cm long; anthers linear, subsagittate, 0,8–1 cm

long. *Ovary* ellipsoid or oblong, 5–8 mm long; style reaching to about middle of anthers, the branches 5–7 mm long, linear, conduplicate, slightly expanded towards the apex or with very small obcordate stigmas.

Recorded mainly from the Cold Bokkeveld in the western Cape but extending from Vanrhynsdorp district to Laingsburg where it is occasional; found in hard stony ground on dry flats and hills, flowering from July to September or early October.

CAPE.—Calvinia: Roggeveld, Fransplaas Farm, *Marloth* 9887 (PRE). Clanwilliam: Elandsdooie, *Lewis* (BOL 27536). Ceres: Cold Bokkeveld, 5 km S. of Leeurivier, *Lewis* 2640 (SAM); Leeurivier, *Barnard* (NBG); Cold Bokkeveld, 73 km N. of Ceres, *Johnson* 512 (NBG); Groenfontein. *Barker* 3044 (NBG); without precise locality: Ceres Wild Flower Show, comm. *Compton* (BOL 19883, BOL, K), *Acocks* 2240 (S). Laingsburg: Tweedside, *Lewis* NBG 2692/32 (BOL); near Klein Swartberg, N. of Seven Weeks Poort, D'Ewes (NBG). Sutherland: 32 km S.S.W. of Komsberg Pass, *Acocks*, 18444 (PRE). Vanrhynsdorp: Holrivier, quartz patch 7 km N. of bridge, *Nordenstam* 806 (NBG). Without locality: *Drège* 8420 (P, S).

Since the first unlocalized plants appeared at the Ceres Wild Flower Show over thirty years ago, when the species was named after the district, it has been collected in several different localities and is now known to cover a much wider area, extending from the Vanrhynsdorp district to Laingsburg, although its main centre of distribution appears to be in the Cold Bokkeveld.

It is allied to *G. virescens* and the flowers closely resemble some forms of the var. *virescens*, with similar colouring and scent. It is distinguished by the different shape of the corm, with more matted and firmer tunics extending up in a somewhat membranous irregular neck, firmer glabrous and shining spinescent leaves, the lowest shorter than in *G. virescens* and the uppermost emerging from the sheath of the second with no visible internode between the two. The bracts are larger and the flowers have narrower lobes tapering to more finely pointed tips.

A rare form, or probably a distinct variety, has been found in hard ground in a white quartzite patch in the Vanrhynsdorp district, which differs in having rather coarser corm tunics of pale raised and irregularly nodular connate vertical fibres, and two sheaths at the base of the stem instead of the usual one, the second green and acute at the apex. The flowers are darker than usual, dull yellow or greyish with very conspicuous purple veins on the upper lobes and the lower lobes yellow in the lower half, purple above, with the small papillate ridges at the base outlined in red. Up to date only two plants have been collected and more material is required to determine whether or not these characters are constant.

The plant figured as *G. ceresianus* in *Curtis's Botanical Magazine* in 1950, t.104 (new series), is not this species but *G. uysiae* and the characters which distinguish these species are discussed under *G. uysiae*.

51. *Gladiolus uysiae* L. Bolus ex Lewis, sp. nov.

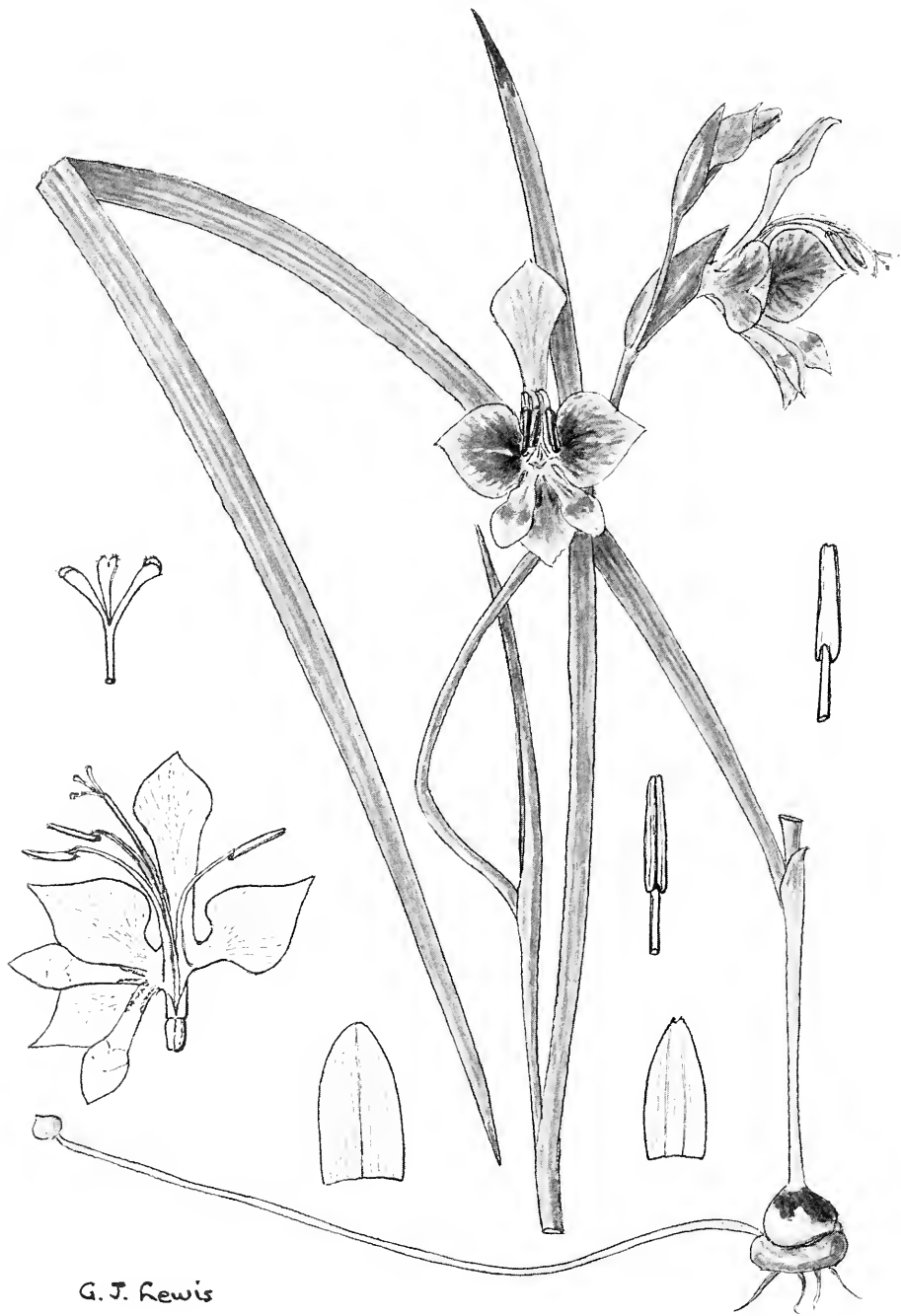
G. uysiae L. Bolus in S. Afr. Gdng & Ctry Life **21** : 367 (1931), in obs., nom. provis. *G. ceresianus* sensu Sealy in *Curtis's bot. Mag.* n.s. t.104 (1950); non L. Bolus 1931.

Gladiolus uysiae L. Bol. ex Lewis sp. nov., *G. watermeyerii* affinis sed folio glabro non distincte striato et perianthii lobo dorsali spathulato longe unguiculato et erecto differt.

Cormus depresso-globosus 1–2 cm diam. tunicis brunneis membranaceis, unicum vel aliquot stolones emittens 4–15 cm longi cormello terminali. *Folia* 3; basale plerumque falcatum applanatum longissimum 8,5–3 cm longum $\frac{1}{4}$ vaginatum venis 1–3 prominentibus ad apicem interdum hispidulis; folium secundum simile sed erectum brevius vagina longiore; folium superum minora. *Spica* ad 24 (–30) cm longa 1–6-flora plerumque 1–3 subsecunda. *Bractea* oblonga vel ovato-oblonga subnavicularis 3,5–1,8 cm longa. *Flores* fragrantés bilabiati cremei vel virides purpureo suffusi 0,4 cm longi; lobi inaequales dorsali longo erecto unguiculato spathulato; lobi laterales superiores patentes late ovati; lobi inferiores ad apicem reflexi minores. *Capsula* non vidi, semina rotundata late alata 1 cm diam.

Type: Cape, Calvinia district, *Buhr* (BOL 19894, holo.).

Corm depressed-globose, 1–2 cm diam., with thin brown membranous tunics, giving rise to 1 or more slender stolons 4–15 cm long terminating in a cormel. *Stem* rather slender, simple, flexuose, the upper half often more or less declinate, 7–24 cm long (up to 30 cm in cultivation), with a single hyaline obtuse sheath 1,5–6,5 cm long at the base. *Leaves* 3, the lowest almost always falcate and longer than the others, 8,5–30 cm long, $\frac{1}{4}$ sheathing, the blade 0,4–1 cm wide with 1–3 slightly prominent veins which are sometimes minutely hispidulous towards the apex; second leaf similar but erect, shorter and with a longer sheath, and uppermost smaller, half or more sheathing. *Spike* short, subsecund, 1–6-flowered, usually 1–3. *Bract* oblong or ovate-oblong, acute to obtuse, subnavicular, 1,8–3,5 cm long; bracteole slightly shorter than bract, bidentate. *Flowers* fragrant, bilabiate, the dorsal lobe cream or greenish with cream margins, veined and suffused with mauve, the upper laterals and lowest purple at the base with purple veins extending out, shading into green with cream margins, and lower laterals with two green blotches near the middle of the blade, yellowish below and creamy above. *Perianth tube* not exerted from bract, 0,7–1 cm long, rather abruptly curved near the top; *lobes* very unequal, all acute or acuminate and unguiculate, the dorsal spathulate, becoming erect as flower opens, 2,5–3,6 cm long, 1–1,3 cm wide; upper laterals patent, ovate above a short claw, acute to acuminate, 2–2,3 cm long, 1,1–1,4 cm wide; 3 lower deflexed, connate for about 2 mm, the lowest like upper laterals but slightly smaller and laterals spathulate, 1,5–2 cm long, 5–7 mm wide, with small raised papillate ridges at the base on the margins of the claw. *Stamens* arcuate, arising near top of tube; filaments 1,6–2,2 cm long; anthers linear, subsagittate, 7–9 mm long. *Ovary* oblong-rotund, 5–7 mm long; style reaching to top of anthers, the branches slender, conduplicate, with small obcordate stigmas 4–6 mm long. *Capsule* not seen; *seed* winged, rounded, 1 cm diam.



G. J. Lewis

FIG. 30. *G. uysiae*.

A rare species from the western Cape found on mountain slopes in the Calvinia, Clanwilliam and Ceres districts, flowering August to September.

FIG. 30. From a painting by G. J. Lewis.—Inflorescence; corm and basal leaf showing young cormel on stolon; top of style and stigmas, $\times 2$; stamen front and back view, $\times 2$; flower laid out; bract and bracteole.

Cape.—Calvinia, Akkerdam *Lewis* 5971 (NBG). September 1962.

CAPE.—Calvinia: Lokenburg, *Barker* 2040 (NBG), *Esterhuysen* 5743 (BOL); Akkerdam, foot of Hantamsberg, *Lewis* 5971 (NBG); Hantam, *Meyer* 19 (B); Calvinia, *Marloth* 10433 (B, PRE). Clanwilliam: Matjesrivier, Cedarberg, *Wagener* 206 (NBG); Doorn River (Doring River), in collibus, *Schlechter* 10882 (BM, BO, BR, G, GRA, GRO, K, L, P, PRE, S, Z). Ceres: Hottentots Kloof, *Lindeberg* (S). Without precise locality: Calvinia district, *Buhr* (BOL 19894).

When Louisa Bolus described *G. ceresianus* in 1931 she mentioned that there was a nearly allied species in the Nieuwoudtville area of the Calvinia district, which she proposed to name *G. uysiae* after Mrs Uys who, with Mr Buhr, had given her a plant from that area. No detailed description was supplied at the time as it was felt that more material and information were required, and in the thirty-odd years since then the name has remained a provisional one.

In 1950 a colour plate of this species was published in *Curtis's Botanical Magazine* (t.104, new series), from plants grown in England by Dr T. T. Barnard from corms which came originally from the vicinity of Nieuwoudtville. A detailed description was given by Mr. J. R. Sealy, who identified it with *G. ceresianus*, although he expressed some doubt as to whether it should be regarded as a flat-leaved form of that species, which it very closely resembles in floral characters, or a distinct species intermediate between *G. ceresianus* and *G. watermeyerii*. He also suggested the possibility of it being a hybrid between those two species but this can be ruled out as *G. uysiae* has now been recorded from several fairly widely separated localities in the Calvinia and eastern parts of the Clanwilliam districts, in only one of which *G. watermeyerii* is known to occur, and in none of them *G. ceresianus*.

In all the records from the field, as well as in cultivation, the leaf of *G. uysiae* is constantly flat and the lowest one more or less falcate, even in young plants arising from the cormels. On the other hand, all the plants of *G. ceresianus* examined have 'terete' leaves and this species differs also in the shape of the corm—which is not stoloniferous—and the texture of its tunics, which extend up in a thin somewhat membranous neck enclosing the base of the stem. Although the flowers of these two species are undoubtedly very similar in shape, size and colouring, though the lobes in *C. ceresianus* are rather longer and taper to more pointed tips, the differences in the corms and leaves alone seem sufficient to warrant treating them as separate species. The slender stolons, spreading out near the surface of the ground and giving rise to a cormel just above or below the surface, are a constant feature of *G. uysiae*.

As in *G. watermeyerii*, the flowers are sweetly scented, rather like violets, but it is well distinguished by its less conspicuously ribbed leaf and by the shape and set of the dorsal perianth lobe, which in *G. uysiae* has a long and fairly slender

claw, is widest near the apex, and becomes erect almost as soon as the flower opens, whereas in *G. watermeyeri* the upper lobe is more or less oblong, widest near the middle with a transparent margin in upper half and tapering a little above and below; it remains arched when the flower is fully open and moreover it flowers somewhat earlier. There is also a difference in the seeds.

52. **Gladiolus alatus** L., Pl. Rar. Afr. 2 (1760). Type: herb. Burman (G, lecto).

Common name: Kalkoentjie.

Corm subglobose, 0,8–1,5 cm diam., with brown or reddish brown membranous tunics often partly or completely disintegrated at flowering time; cormels sometimes present clustered round the base or borne on short capillary stolons. *Stem* slender to moderately stout, 8–35 cm long, usually 15–25 cm, flexuose, simple or occasionally branched, more or less ancipitous, sometimes with a long slender part below ground bearing 1 or more cormlets. *Basal sheath* solitary, hyaline, obtuse, 2,5–12 cm long or in a form with a long underground stem sometimes up to 19 cm. *Leaves* 4–5, firm, the lowest falcate to suberect, 8–40 cm long, usually much longer than others, with a short sheath and linear or lanceolate acuminate blade, occasionally ensiform and subacute, 0,1–1 cm wide, striate with 2 several equally prominent more or less hispidulous veins, rarely glabrous; upper leaves similar but smaller and erect except the uppermost which is usually bract-like, subnavicular, carinate and 2,5–7,5 cm long. *Spike* secund, 1–10-flowered, generally 1–6. *Bract* oblong, navicular, carinate, acute to obtuse, 2–5 cm long, often with narrow red or hyaline margins and the keel sometimes red; bracteole usually shorter than bract, bicarinate, with the keels raised often red up to 5 mm apart, usually scabridulous. *Flowers* scented, bilabiate, varying from small to medium-sized, the upper lobes and tips of lower in various shades of brick-red, salmon, orange-red or orange, sometimes with a deeper zone towards the base of the upper laterals, the greater part of the lower lobes yellow, greenish yellow or lime-green; small white papillate ridges are present in the throat at base of the three inner lobes. *Perianth tube* 1–1,6 cm long, curved, the upper half funnel-shaped; *lobes* very unequal, unguiculate, sometimes apiculate, the dorsal arched and hooded in some varieties, becoming porrect or erect in others, 3–4,8 cm long, with a short broad claw 4–8 mm wide, the blade oblong to obovate, obtuse or subacute, 1,5–2,8 cm wide; upper laterals patent, 2–3 cm long, with a very short claw and deltoid or ovate-deltoid blade 2–3 cm wide; lower lobes deflexed, with fairly long slender claws connate for 4–6 mm, the laterals spatulate, obtuse to acute, 2–3 cm long, 0,5–1,2 cm wide, the lowest slightly shorter with a deltoid or ovate-deltoid blade 0,8–1,8 cm wide. *Stamens* arcuate, arising near middle of tube; filaments 2–2,6 cm long, more or less pubescent; anthers linear, subsagittate, 0,7–1 cm long. *Ovary* ellipsoid, 5–8 mm long; style with the middle section pubescent or puberulous, reaching to middle or top of



H. B. K. 1811. MEXICO



Pl. 16.

G. tristis var. *tristis*

Species 63a

anthers, the branches 5–7 mm long, linear, conduplicate, with small oblong or obcordate stigmas. *Capsule* oblong, pallid, thin-walled, 1.6–2.5 cm long; *seeds* orbicular or oblong-orbicular, broadly winged, yellow-brown, 7–9 mm long.

Some forms of *G. alatus* adopt a creeping habit, the stems, which may be up to 40 cm long, taking on a horizontal position below the surface and producing cormlets in the axils of the 2–3 buried leaf bases; thus no doubt assisting in its distribution.

Widespread and frequent in the Cape winter-rainfall region from Namaqualand in the west to the Cape Peninsula and along the south-eastern coastal belt from Caledon to Bredasdorp, on sandy or gravel flats, hillslopes and plateaux, flowering from August to October, with one probably now extinct variety in the Port Elizabeth area.

Five varieties are recognized.

KEY TO VARIETIES

Leaves with 2–several equally prominent more or less hispidulous veins (rarely glabrous) and no well-defined midrib:

Lower perianth lobes yellow to lime-green tipped with the same reddish to orange colour as the upper, the 2 laterals spatulate. (a) var. *alatus*

Lower perianth lobes the same colour as the upper but with a small lime-green area edged with dark red at the base, the 2 laterals with slender claws and ovate blades (b) var. *meliusculus*

Leaves, or at least the lowest, with a distinct midrib, the other veins when present less conspicuous and not or very slightly prominent, all glabrous:

Variety recorded only from the Port Elizabeth district and probably exterminated (c) var. *algoensis*

Varieties confined to the south-western districts from Clanwilliam to Malmesbury:

Dorsal perianth lobe remaining arched and hooded in mature flowers; filaments and style glabrous or filaments sometimes slightly puberulous at base only (d) var. *speciosus*

Dorsal perianth lobe becoming porrect to erect and not hooded in mature flowers; filaments and part of style pubescent (e) var. *pulcherrimus*

(a) var. *alatus*

G. alatus L., Pl. Rar. Afr. 2 (1760), Sp. Pl. ed. 2, 1 : 53 (1762) et Amoen. Acad 6 : 83 (1763); Hoult., Nat. Hist. (II) 12 : 45 (1780); Thunb., Diss. Glad. 16 (1784), Fl. Cap ed. Schult. 47 (1823); Lam., Encyc. 2 : 724 (1786); Andr., Bot. Rep. t.8 (1799); Ker in Curtis's bot. Mag. t.586 (1802), Gen. Irid. 132 (1827); Pers., Syn. 1 : 44 (1805); Vahl, Enum. 2 : 100, var. b (1806); Ait., Hort. Kew. ed. 2, 1 : 97 (1810); Roem. & Schult., Syst. Veg. 1 : 416, 420 (1817); Spreng., Syst. Veg. 1 : 152 (1825); Sweet, Brit. Fl. Gard. 2, t.187 (1827) et Ornam. Fl. Gard. 4, t.228 (1854); Klatt in Linnaea 32 : 690 (1863); Bak. in J. Linn. Soc. 16 : 177 (1877), Handb. Irid. 223 (1892), Fl. Cap. 6 : 159 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 212 (1893) excl. syn. *Hebea alata* Eckl.; Marloth, Fl. S. Afr. 4, t.47 B (1915); Duthie in Ann. Univ. Stell. 8, No. 4, t.1 (1930); L. Bol., Barclay & Steer, Second Bk S. Afr. Flrs t.170 (1936);



FIG. 31.

1. Type of *G. alatus* L. var. *alatus* (herb. Delessert, G).

Photo: By courtesy of Herb. Delessert, Geneva.

2. Type of *G. alatus* L. var. *speciosus* (Thunb.) Lewis (herb. Thunberg, UPS).

Photo: By courtesy of University of Uppsala.

Kidd, Wild Flrs Cape Penins. t.59 f.1 (1950); Lewis in Adams. & Salter, Fl. Cape Penins. 257 (1950). Type: Cape, herb. Burman (G, lecto., NBG, PRE, photo.).—var. *uniflorus* Klatt in Abh. Naturf. Ges. Halle **12** : 337 et Ergänzt. 3 (1882); Dur. & Schinz, l.c. 212. Type var.: Cape, herb. Willdenow 916 (B). *G. galeatus* Burm. f., Prodr. Cap. 2 (1768). Type: herb. Burman (G).

G. papilionaceus Licht. ex Roem. & Schult., l.c. 408; Ker, Gen. Irid. 146 (1827); non Salisb. 1796. Type: as for *G. alatus* var. *uniflorus*.

Hebea galeata Eckl. Top. Verz. 41 (1827).

Pre-Linnaean: *Sisyrinchium viperarum* Plukenet, Phyt. t.224 f.8 (1691–1705).

The typical variety is very common in the south-western Cape and is well known as a 'Kalkoentjie' (little turkey), so called because of its flowers, which resemble the wattles of a turkey. It was one of the first *Gladioli* to be illustrated. There is a picture of '*Gladiolus esculentus*' by Claudius in Van der Stel's diary (*Dagboek*) of his expedition to Namaqualand in 1685 (cf. Waterhouse, t.829, 1932) and although somewhat crude, it appears to be this species. Plukenet had access to these Claudius plates, for they were given to Bishop Compton 'for services rendered' by William of Orange, whom he had crowned as king. A copy of Claudius's figure, by this time almost unrecognizable, appeared in his *Phytographia* t.224 f.8 (1691–1705) under the name '*Sisyrinchium viperarum*' and this was cited by Linnaeus when he described *G. alatus*. Dr T. T. Barnard believes it is likely that the Burman specimen in the Geneva Herbarium, here chosen as a lectotype, is the actual plant described by Linnaeus in his *Plantae Rariores* of December 1760, where he described 102 new species of Cape plants; about 75 of these were described plants on loan from the Burman Herbarium and the types should therefore be at Geneva. The specimen fits the description very well; there is a corm, the stem is spithameus (viz. approximately 19 cm) and flexuose between the flowers; the basal leaves have been chewed down, which made Linnaeus describe them as 'obtusiuscula'. The open lower flowers have the upper segment folded over and falcate and were described as 'galea falcata angusta'; furthermore the lower lip of the left-hand flower is prominently tripartite with the segments ovate and of equal length. Apparently Linnaeus never wrote on Burman's loan sheets and N. L. Burman, who diverted to the *Flora Indica* upon his return, did not label them either, which may account for the absence of a name. This lectotype appears to have been excised from some old herbarium, possibly that of Oldenland. (See fig. 31.1.)

The only specimens of *G. alatus* in the Linnaean Herbarium are two of Sparrman's (no. 43) on sheet 59.4, with an unpublished name, *labialis*, written on the sheet by Linnaeus, and below this *Glad. alatus* S.N. (i.e. *Systema Naturae*—the latter name written by Sparrman according to Mr Savage in his Catalogue of the Linnaean Herbarium). As Sparrman's plants were not collected until twelve years after the name was published they cannot be the type.

In the British Museum there are two specimens of *G. alatus* in Petiver's collection of plants gathered at the Cape of Good Hope by Oldenland (H.S.

156, p. 185) but it is unlikely that either of them could be regarded as the type. In the first place it is not known whether or not they were seen by Linnaeus, and secondly they do not agree as well with the description as does the specimen in Burman's Herbarium.

There is no reference to the colour of the flower in Linnaeus's rather brief description and Jacquin, Ker and one or two other botanists of that period confused *G. orchidiflorus* Andr., which was figured (and described) by Andrew in 1802, with *G. alatus*. Although its flower is somewhat similar to that of *G. alatus* the colouring and scent are entirely different, and among other distinguishing characters the dorsal perianth lobe is much narrower and remains permanently arched. Under the name *G. alatus*, Jacquin published a very fine illustration of *G. orchidiflorus* in his *Icones*, t.258 (1793-4), and another excellent illustration appeared in *Curtis's Botanical Magazine* in 1803, named *G. viperatus* by Ker who cited Plukenet's figure and for the specific epithet modified the term used by Plukenet for his plant. However, there can be no doubt that the plant figured by Claudius and Plukenet represents *G. alatus*, in which species one-flowered plants are fairly common, whereas they do not occur in *G. orchidiflorus*.

An illustration of another single-flowered plant published by Breynius in 1739 in his *Prodromus* (t.12 f.2) resembles Plukenet's, but apart from the fact that it is more accurate and cannot be mistaken for any other species, the distinctive colouring of the flower was described by Breynius. In 1768 this figure was cited by Burman f. and named *G. galeatus* by him, and in his herbarium there is a specimen with this name. Presumably he considered it to be distinct from the species described by Linnaeus on account of its broader and more erect dorsal perianth lobe, which is in fact typical of *G. alatus* var. *alatus*.

The variety has a pleasant and unusual scent which Ker likened to that of sweet-briar. The common name by which it is known in this country, Kalkoentjie (little turkey), is very old and there are references to it in botanical literature of the early nineteenth century.

COLOUR PLATE 15. ALEIDA VAN DER MERWE.—Inflorescence; double corm with leaves.

Cape.—Without locality; ex hort. Pretoria.

CAPE.—Bredasdorp: 30 km S.W. of Bredasdorp, *Sidey* 1828 (S.). Caledon: Between Villiersdorp and French Hoek Pass, *Barker* 7544 (NBG), *Davis* (SAM 60201); between Caledon and Villiersdorp, *Barker* 24 (BOL); Kleinmond, *Topper* 152 (NBG). Calvinia: Willemsrivier, *Leipoldt* 810 (SAM); Grasberg, *Barker* 9542 (NBG); W. of Nieuwoudtville, *Marloth* 7639 (PRE); about 16 km from Nieuwoudtville on Graskop (? Grasberg) road, *L. Bolus* (BOL 19592); top of Van Rhyn's Pass, *Lewis* 6125 (NBG). Cape Peninsula: Blouberg, *Stokoe* (SAM 65817). Cape Town, *Prior* (K, PRE, Z); Green Point, *Prior* (K); Steenberg, *Compton* 13796 (NBG); near Cape Town, *MacOwan* 2268 (SAM, S); Lion's Head, *Rehmann* 934 (Z), *Schlechter* 1352 (BM, G, K, Z) *De Jongh* sub *Galpin* 4923 (PRE, GRA), *Wilms* 3699 (AMD, BM), *Ecklon* 134 (GRA) 964 (S); Devil's Peak, *Pappe* (SAM 21430), *Bolus* 3798 (PRE, BOL); Driekoppen, *Pappe* (SAM 70655); Camp Ground near Mowbray, *Moyle Rogers* (BM); Silvermine valley, *Salter* 335/15 (BM); W. slopes Lion's Head, *Dod* 1563 (BOL); Little Lion's Head, *Acocks* 5043, 5168 (S); Signal Hill, *Hafström* (S). Ceres: Elands-kloof, *Barker* 3080 (NBG); between Elands-kloof and Ceres, *Rycroft* 2554 (NBG); near Leeurivier Bridge, *Horrocks* 35 (NBG); near Ceres, *Lotsy* & *Goddijn* 122(L); Ceres Peak, lower slopes, *Acocks* 1807 (S); Bokkeveld, *Marloth* 7939 (PRE). Clanwilliam:

Pakhuis Pass, *Barker* 2001 (NBG), *Lewis* (BOL 22268); Olifants River valley, near Clanwilliam, *Lewis* 629 (SAM); Olifants River valley, *Schlechter* 4984 (AMD, BM, BOL, BR, C, G, GRA, K, P, PRE, S, UPS, Z), *Penther* 682 (S, Z), *Stephens* 7064 (BM, K); near Clanwilliam, *Zeyher* (K), *Mader* 98 (BM), *Leipoldt* 4429 (BOL); Citrusdal, *Barker* 3605 (NBG), *Martin* 816 (NBG); Elandsloof Bridge, 16 km S.E. of Citrusdal, *Johnson* 521 (NBG); Brakfontein, *Ecklon & Zeyher* 76 (BR, C, LD, Z), 134 (G, LD), s.n. (PRE); Cedarberg, *Thode* A2089 (PRE), *Pocock* 323 (PRE). Hopefield: Vredenburg, *Lewis* 5982 (NBG). Laingsburg: Cabidu, *Compton* 12106 (NBG). Malmesbury: Between Kalabaskraal and Malmesbury, *Hutchinson* 192 (BOL, K); Darling, *Cloete* (BOL 14758); between Wellington and Malmesbury, *Salter* 1327 (BM, K); Groenkloof, *Ecklon & Zeyher* 285 (G). Paarl: near Paarl, *Drège* 8447 (SAM); top of Dutoitskloof Pass, *Lewis* 3652 (SAM); Groot Drakenstein, *Rogers* 17779 (Z); upper Witte River valley, *Esterhuysen* 21790 (BOL); Berg River, near Paarl, *Drège* 8447 a (BM, CGE, G, K, L, OXF, P, S); Klapmuts, *Schenck* 587 (Z). Piketberg: between Het Kruis and Papenkuil, *Zinn* (SAM 52914); Kapteinskloof, *Pillans* 7811 (BOL); Mouton valley, *Marloth* 11478 (PRE). Robertson: McGregor, *Barker* 2037 (BOL, NBG); between Robertson and McGregor, *Lewis* 6058 (NBG). Somerset West: Hottentots-Holland, *Hutchinson* 317 (K). Stellenbosch: Jonkershoek, *Lanjour* 360 (U); Stellenbosch, *Sanderson* 956 (K); near Elsenburg, *Van Nickerk* 289 (BOL); Koelenhof, *Strey* 564 (PRE, K); Stellenbosch Flats, *Garside* 88, 1534 (K); Kanonberg, Brackenfell, *Acoks* 556 (S). Tulbagh: Saron, *Andrag* NBG 2391/32 (NBG); De Hoek, Saron, *Steyn* 604 (NBG); Wolsley, *Heginbotham* 52 (NBG). Vanrhynsdorp: Gifberg, *Phillips* 7521 (K, SAM), *Middlemost* 2177 (NBG); between Driefontein and Heerenlogement, *Pearson* 6810 (K). Wellington: Wellington, *Grant* 2370 (PRE, BM), *Heatley* in herb. Moss 5990 (BM). Worcester: eastern end of Dutoitskloof, *Lewis* 6042, 6045 (NBG); Brandvlei, *Lewis* 6051 (NBG); Hex River valley, *Davidson* 86 (SAM); between Worcester and Villiersdorp, *Barnard* (SAM 68411); near Botha's Halt, *Van Breda* 994 (PRE, K); 17 km E.N.E. of Worcester, *Leistner* 685 (K, PRE). Wynberg: Cape Flats near Duikervlei, *MacOwan* HAA 278 (BM, G, K, P, SAM, UPS).

WITHOUT LOCALITY: *Sparman* 43 (LINN), s.n. (S); *Lamarck* (P); *Jussieu* 3651—partly, 3639—partly (P); *Burman* (G, lectotype); *Burman* (G—type of *G. galeatus*); *Thunberg* (G, LD, S, UPS—sheet 999 in herb. Thunb.); *Schlechtendal* (G); *Leibold* (G); *Sieber* 236 (BR, G, K, L, OXF, P, S), 392 (L, G); *Willdenow* no. 916 (B—type of *G. papilionaceus* and *G. alatus* var. *uniflorus*); *Verreaux* (G, K, P); *Prior* (K); *Pappé* (K, S); *Forsyth* (K); *Roxburgh* (G); *Thom* (K); *Auge* (BM); *Harvey* 68 (BM), 919 (BM, K); *Bowie* 2 (BM); *Pearson* (L); *Kolbing* 20 (LE), 21 (BM); *Ecklon & Zeyher* (AMD); *Oldenland* 5, 182 (BM—HS 156, p. 185).

HYBRIDS

G. alatus × *G. virescens*

Worcester: eastern end of Dutoitskloof, *Lewis* 6046 (NBG).

G. alatus × *G. virescens* var. *lepidus*

Bredasdorp: 3 km W. of Napier, *Nordenstam* 1390 (NBG).

G. alatus × *G. carinatus*

Paarl: Suid-Agter-Paarl, Weltevreden Farm, *De Villiers* (NBG).

Two of the hybrids cited above, one a cross with *G. virescens* and the other with a variety of *G. virescens*, are almost identical. Both have vegetative characters more like those of *G. virescens* and flowers like those of *G. alatus* though rather smaller than average and a much deeper red, with darker veining on the dorsal lobe and the lower part of the lower lobes a brighter orange-yellow than usual. Several plants of the first were seen, growing among both parents in the same area, but there is only one recorded of the second, without either of the parents, although both are known to occur in the same locality, and its similarity to the other hybrid leaves no doubt as to its origin. The third, a natural hybrid between *G. alatus* and the yellow colour form of *G. carinatus*, was found by Mrs De Villiers on her farm in the Paarl district, where it was growing with both parents. The flowers are attractive, with the shape, set and scent such as in *G. alatus*, but they differ in colour, being old rose tinged with mauve and, except for the tips, the lower lobes are lime-green on opening but

soon change to orange. The blade of the lower side-lobes is rather longer and more oblong than in *G. alatus*, tapering rather abruptly to an acute tip.

(b) var. **meliusculus** Lewis, var. nov. a var. *typica* floribus delicatis roseis vel roseo-aurantiacis, lobis inferioribus ad basin viridibus rubromarginatis differt. Type var.: Cape Malmesbury district, Darling. Ganskraal road, *Barker* 2000 (NBG, holo.).

It is figured in Rice & Compton, Wild Flrs Cape of Good Hope t.210 (1951).

Distinguished from var. *alatus* by the more delicate texture and colouring of the flowers and the smaller ovate blades of the lower lateral lobes.

Corm, stem, leaves, spike and bracts as in var. *alatus*. *Flowers* softer in texture, pink, old rose or rose-orange, with a small lime-green area edged with dark red at base of blade of 3 lower lobes; 3 upper lobes and lowest as in var. *alatus* but lower laterals ovate-spathulate, with longer claws than the lowest and smaller ovate blades 1,1–1,5 cm wide. *Stamens* and *gynaecium* as in var. *alatus* but slightly smaller, the filaments about 1,5 cm long, anthers 5–7 mm long and style branches 4–6 mm long.

Sandy flats in the Cape, Malmesbury and Hopefield districts of the Cape Province sometimes locally common, flowering from September to October.

CAPE.—Cape Peninsula: Lion's Head, *Drège* 8447 b (G, K, P, S). Hopefield: Hopefield, *Pattison* (BOL 27534); 8 km from Hopefield on Darling road, *Thompson* 62 (NBG); near Hopefield, *Bachmann* 1119 (Z). Malmesbury: Kalabaskraal, *Barker* 2550 (NBG), *Leighton* 52 (BOL), *Werdermann & Oberdieck* 322 (PRE), *Rycroft* 2561 (NBG); Darling–Ganskraal road, *Barker* 2000 (NBG); Darling, near road to Mamre, *Gillett* 2082 (K); Darling, *Barker* 2677 (NBG); near Darling, *Bolus* s.n. (BOL), *Grant* 2565 (PRE, K); Mamre hills, *Barker* 2045 (NBG); near Mamre, *Sidey* 2280 (S); Mamre road, *Kies* (NBG); near Groenkloof, *Bolus* s.n. (BOL); 32 km from Cape Town on Malmesbury road, *Thompson* 55 (NBG); road to Malmesbury, *Godman* 451 a (BM). Cape: Killarney, *Lussem* 48 (NBG); Ndabeni, *Salter* 8676 (BOL). Cape Flats, *Letty* 217 (PRE). Without locality: *Brehm* 191 (M); *Thunberg* (S); *Swarts* (S).

This very attractive variety, the Darling 'pink kalkoentjie', is readily distinguished from var. *alatus* by the characters of the flower mentioned above, not only in the field but also when dried. Although both varieties occur in the same districts and flower at the same time, they appear to remain distinct and no intermediates have been recorded. A rare and very attractive albino form, with the upper lobes and tips of the lower lobes white and remainder of the lower lip lime-green, has been exhibited at the Darling Wild Flower Show, from plants found on a farm in that area.

(c) var. **algoensis** Herb. in Curtis's bot. Mag. t.2608 (1825); Klatt in Abh. Naturf. Ges. Halle **12** : 337 et Ergänz. 3 (1882); Dur. & Schinz, Consp. Fl. Afr. **5** : 212 (1893).

G. algoensis (Herb.) Sweet, Hort. Brit. ed. 1, 397 (1827); Loudon, Ladies Fl. Gard. Orn. Bulb. Pl. t.13 f.4 (1841). Type var.: Cape, Port Elizabeth district, Curtis's bot. Mag. t.2608.

Plants evidently sturdier than in var. *alatus* with a somewhat stouter stem and ensiform leaves, the lowest not much longer than the others, several-

veined, with a distinct midrib and the other veins less conspicuous, not or hardly prominent and glabrous. *Flowers* a paler more pinkish shade than var. *alatus*, with a reddish zone in lower half of upper lateral lobes, the lobes apparently more acute and the dorsal remaining arched and concave when fully open. *Stamens* and *style* pubescent as in var. *alatus*.

Recorded only from the Port Elizabeth district (September) but no recent records and probably exterminated.

CAPE.—Port Elizabeth: near Port Elizabeth, *Pappe* (SAM 48499).

This variety is known only from the illustrations cited above and two specimens in the South African Museum Herbarium collected by Pappe over a hundred years ago. It was not mentioned by Baker in the *Flora Capensis* and there are no recent records, so it is presumed to have been exterminated, possibly by the expansion and development of the city or by the Australian wattles which now cover large areas of the sandy flats in the vicinity of Port Elizabeth. In Pappe's plants the leaves are 0.8–2.3 cm wide, the two lower with slightly prominent crenulate margins and the midrib more conspicuous than the other veins, none of which are prominent. The stem is moderately stout in both and one of them has two branches.

(d) var. **speciosus** (Thunb.) Lewis, stat. nov.

G. speciosus Thunb., Fl. Cap. 196 (1811), ed. Schultes 48 (1823); Ker, Gen. Irid. 132 (1827); N.E. Br. in J. Linn. Soc. **48** : 30 (1928). Type: Cape, *Thunberg* 1071 (UPS, holo.). (See fig. 31, 2.)

Differs from var. *alatus* in the venation of the leaves, the dorsal perianth lobe remaining arched and hooded in mature flowers, and the filaments and style being glabrous or sometimes sparsely puberulous at the base.

Corm, stem and leaves as in var. *alatus* but the venation of leaves different, the lowest having a distinct slightly prominent midrib, slightly prominent margins, and the other 1–4 veins when present less conspicuous and not or very little raised, all glabrous. *Spike and bracts* as in var. *alatus*. *Flowers* orange, orange-red or red, the lower lobes as in var. *alatus* but the upper laterals usually with a greenish yellow or yellow patch on the outside. *Perianth lobes* similar to those of var. *alatus* but the dorsal remaining arched and hooded in mature flowers and blades of the upper laterals and lowest more deltoid in shape. *Stamens* as in var. *alatus* but the filaments glabrous or sometimes sparsely puberulous only at the base. *Gynaecium* as in var. *alatus* but style glabrous.

Occasional on sandy flats and in sandy valleys and kloofs in the Malmesbury to Clanwilliam districts in the Cape Province, flowering from August to September.

CAPE.—Clanwilliam: Citadel Kop, *Compton* 24261 (NBG); Nardou, *Barker* 4739 (NBG); Klipfonteinrand, *Barker* 4724 (NBG); Lange valley, *Leighton* (BOL 27533); Krom River, *Leighton* (BOL 27531), *Stokoe* (SAM 60212); near Brandewyn River, *Lewis* 1845 (SAM). Hopefield: 5 km W. of Koperfontein,

Thompson 56 (NBG); near Hopefield, *Bachmann* 122 (Z). *Slatter* 4762 (BM). Malmesbury: between Darling and the coast, Darling Wild Flower Show, comm. *Lewis* 6106 (NBG); Darling—Ganskraal road, *Compton* 9444 (NBG). Piketberg: Waterval farm, N.E. of Porterville, *Loubser* 2005 (NBG); Porterville, *Loubser* 377 (BOL); 3–5 km S. of Sauer, *Lewis* 3636 (SAM). Without locality: *Thunberg* 1071 (UPS, type of *G. speciosus*).

N. E. Brown considered *G. speciosus* Thunb. to be a distinct species, but he saw only the single type specimen in Thunberg's Herbarium, of which he wrote as follows:

'One sheet. This name must be retained for this plant, for it is not *G. alatus* L. as named by Klatt and under which Baker has placed it as a synonym, for it differs from that species in the venation of its leaves. Its flowers are similar to those of *G. alatus* but it is a much more dwarfed plant, being only 5 in. high, with 2 linear leaves, respectively $7\frac{1}{2}$ and $2\frac{1}{2}$ in. long and $1\frac{1}{2}$ –1 in. wide, with venation similar to that of *G. arcuatus* Klatt, and not at all like that of *G. alatus*. I cannot match Thunberg's plant with any specimen at Kew.' *J. Linn. Soc.* 48 : 30 (1928).

Although differing in the venation of the leaves and in certain characters of the flower mentioned above, it is too closely allied to *G. alatus* to be kept separate and should rather be treated as a variety. It is by no means as common nor as widespread as var. *alatus* but nevertheless has been collected in several areas in the Malmesbury, Piketberg and Clanwilliam districts. Among the collections in the Bolus, Compton and South African Museum herbaria are a few plants which exactly match Thunberg's type, but as in var. *alatus*, and in fact in almost all species, the size of the plant is variable, and some are considerably taller and more robust than the type, with leaves occasionally up to 1 cm wide.

Thunberg described the leaf as five-nerved but in his specimen the lowest leaf is two-nerved, the midrib slightly prominent and second vein inconspicuous. The second leaf of the plant is five-nerved, with the midrib and one other vein slightly more prominent than the other three.

A colony growing near Darling on the farm Buffelsrivier, 1 km inland from the coast (*Barker* 10797, Sept. 1970, NBG), although belonging to the var. *speciosus*, displayed an unusual colour pattern of the perianth. The upper laterals and lowest lobe were round, almost broader than long; the colouring of the upper laterals was a deep dark red with an orange margin separated by a streaky dark wine-red line; on the outside they were green. The dorsal lobe was oblong in shape and permanently hooded, old rose in colour. The lower laterals were spatulate but appeared even narrower because of their involute margins. The lowest lobe was a bright light green with an orange margin, separated by a streaky wine-red line. The flower, about 5 cm long, was strongly scented.

(e) var. **pulcherrimus** Lewis, var. nov. a var. *typica* foliis costis prominentibus nervis glabris differt; a var. *specioso* et *algoensi* lobo dorsali erecto vel semi-erecto non cucullato differt. Type var.: Cape, Clanwilliam district, Olifants River valley, 18 km S. of Klaver, *Lewis* 5220 (NBG).

Distinguished from var. *alatus* by the different venation of the leaves, with a distinct midrib more conspicuous than the other veins, all glabrous, and from vars. *speciosus* and *algoensis* by the dorsal perianth lobe becoming porrect to erect and not hooded in mature flowers.

Corm and stem as in var. *alatus* but leaves usually wider, up to 1,5 cm, the lowest comparatively shorter than in var. *alatus* with slightly prominent margins and midrib, the margins more or less crenulate, and 1–several less conspicuous veins, sometimes a little raised, all glabrous. Bracts and flowers as in var. *alatus*.

Recorded from Clanwilliam and Piketberg districts of the western Cape, in sandy valleys, kloofs and mountain slopes, flowering from August to September.

CAPE.—Clanwilliam: N. of Palesheuwel, between Berg valley and Lange valley, *Acocks* 2899 (S); Olifants River valley, 17 km S. of Klawer, *Lewis* 5220 (NBG); Pakhuiskloof, *Barker* 273 (NBG); Nieuwoudt Pass 660 m, *Leighton* (BOL 27532); Nardou Pass, *Salter* 7537 (SAM), *Stokoe* (SAM 59619, 59754); Clanwilliam, *Leipoldt* 244 (BOL, SAM), *Mader* 98 (GRA, K). Piketberg: near Het Kruis, *Bond* 560 (NBG), *Barker* 2689 (NBG).

This variety is more or less intermediate between var. *alatus* and the little-known var. *algoensis*, with leaves very similar to those of the latter and flowers like those of the former. Although the venation of the leaves is much the same as in var. *speciosus* they are usually somewhat wider and the lowest is comparatively shorter with rather more prominent margins which are more or less crenulate. The flowers, with the dorsal lobe becoming porrect to erect and not hooded, and with the filaments and part of the style pubescent, also serve to distinguish it from var. *speciosus*.

In var. *pulcherrimus* the plants are more often branched and there are usually a few more flowers to the spike than in the other varieties, more of them open at the same time, which makes it the most spectacular and attractive of the varieties for the horticulturist.

53. ***Gladiolus equitans*** Thunb., Prodr. 186 (1800), Naturhist. Selsk. Kobenh. 6, t.2 (1810), Fl. Cap. 192 (1811), ed. Schult. 47 (1823); N. E. Br. in J. Linn. Soc. 48 : 21 (1928). Type: Cape *Thunberg* 1021 (UPS, holo.).

G. galeatus Andr., Bot. Rep. t.122 (1800); Pers., Syn. 1 : 44, B (1805); non Burm. f. 1768, nec Jacq. 1786–93. Type: Bot. Rep. t.122. *G. namaquensis* Ker in Curtis's bot. Mag. t.592 (1802) et Gen. Irid. 132 (1827); Vahl, Enum. 2 : 91 (1806); Ait., Hort. Kew. ed. 2, 1 : 98 (1810); Roem. & Schult., Syst. Veg. 1 : 417 (1817); Spreng., Syst. Veg. 1 : 152 (1825); Reichb., Fl. Exot. 1, t.36 (1834); Loudon, Ladies Fl. Gard. Ornam. Bulb. Pl. t.13 (1841). *G. alatus* L. var. *namaquensis* (Ker) Bak. in J. Linn. Soc. 16 : 177 (1877), Fl. Cap. 6 : 159 (1896); Klatt in Abh. Naturf. Ges. Halle 12 : 337 et Ergänzt. 3 (1882); Dur. & Schinz, Consp. Fl. Afr. 5 : 212 (1893); Pole Evans in Flower. Pl. S. Afr. 2, t.63 (1922) Type: Cape, *Masson* (BM, holo.).

Corm ovoid, 1,5–3,5 cm diam., with reddish brown submembranous tunics, sometimes with an outer coat of darker partly connate fibres. Stem sturdy, triquetrous, 15–45 cm long, usually simple, flexuose, the upper half sometimes

declinate, with a single obtuse mucronate sheath 2–8,5 cm long at the base. *Leaves* 4 (rarely 3), coriaceous, the 2 or 3 lower with the lower $\frac{1}{4}$ to $\frac{1}{2}$ sheathing and striate, somewhat abruptly expanded into a broad ensiform, oblong or sometimes ovate-oblong blade, acute or obtuse, subequally and not prominently several-veined, with prominent brownish or reddish margins prolonged into a hard dark more or less spinescent mucro at the apex; lowest leaf falcate or suberect, 10–30 cm long (including sheath), 1,6–4,5 cm wide; second and third usually shorter and a little narrower, and the uppermost bract-like, conduplicate, navicular, carinate, 4–8 cm long. *Spike* secund, the rhachis twisted, 3–9-flowered. *Bract* and bracteole usually with conspicuous red margins and keels, the bract navicular, carinate, acute, 6–2,8 cm long, 2,2–1,5 cm wide; bracteole 4–2,4 cm long, ovate, slightly wider than bract, bicarinate and usually bidentate. *Flowers* fragrant, medium-sized, bilabiate, the upper lobes, tips of the lower laterals and upper half of the lowest orange, brick-red or vermilion and remainder of lower lobes yellow to lime-green, the lower laterals with small yellow-green papillate ridges on the margins at the base and in the throat below, the dorsal lobe with two similar small white ridges outlined in red. *Perianth tube* not or very little exerted from middle of bract, 1,2–1,6 cm long, curved, slender, slightly expanded towards the throat; *lobes* very unequal, the 3 upper not unguiculate; dorsal arcuate, hooded, obovate, obtuse, 3,3–4,5 cm long, 2,4–2,8 cm wide; upper laterals patent, ovate or deltoid, acute or subacute, 2,3–3,5 cm long, 2,7–3 cm wide; 3 lower deflexed, unguiculate with slender canaliculate claws connate for 3–5 mm, the laterals spatulate, obtuse, 3–3,5 cm long, 1 cm wide, with the claw and blade about equal in length, the lowest with a shorter claw and larger ovate or deltoid acute or subacute blade 1,5–2 cm wide. *Stamens* arcuate, arising shortly below top of tube; filaments 2,3–3 cm long; anthers linear, subsagittate, 0,9–1,3 cm long. *Ovary* ellipsoid, 0,7–1,2 cm long; style reaching to middle or nearly to top of anthers, the branches 5–7 mm long, linear, conduplicate, with small obcordate stigmas. *Capsule* ellipsoid, pale creamy brown, 3–4 cm long; *seeds* orbicular or oblong-orbicular, broadly winged, yellow-brown, 0,8–1 cm long.

Known only from the western Cape on mountains and hills in Namaqualand, occasional among granite boulders, usually in rock fissures; in hard stony ground on white quartzite patches in the Vanrhynsdorp district, flowering from August to October, at high altitudes sometimes November.

CAPE.—Namaqualand: Concordia, *Marloth* 7066 (PRE); Steinkopf, *Herre* (STE 11851); Leliefontein, *Rodin* 1463 (BOL, K, PRE); De Kom (Karas Farm), 5 km from Leliefontein, 140 m, *Leipoldt* 3590 (PRE, BOL); Kamieskroon, *Hutchinson* 991 (BOL, K); near Eselsfontein and Roodeberg, 1 000–1 200 m, *Drège* 2645 (G, P, S); Kasparskloof, *Drège* 2645 a (P); Okiep, *Morris*, Herb. Bolus 5793 (BOL, K, BM, Z); near Springbok, *Gill* (SAM 54333), *Acocks* 19582 (NBG, K, PRE); Brakdam, *Leighton* 1136 (BOL), *Lewis* 1389 (SAM), *Compton* 17197 (NBG); Skilpad, near Grootvlei, *Lewis* 5003 (SAM), 5468, 6188 (NBG); without precise locality: *Scully* 147 (BM, BOL); *Stokoe* 6174 (BOL). Vanrhynsdorp: Holrivier, *Hall* 2520 (NBG); without precise locality, *Rood* (PRE 1468, K); Without locality: *Thunberg* (UPS 1021); *Masson* (G); *Masson* (BM, type of *G. namaquensis* Ker).

Baker, Klatt, Durand & Schinz and Pole Evans treated this as a variety of *G. alatus*, which it closely resembles in its habit and the colour, scent and

appearance of the flowers, but there are a few well-marked characters which distinguish it and Lewis agreed with N. E. Brown, who followed Ker and other authors in upholding it as distinct.

The corm is twice as large as that of *G. alatus*, ovoid instead of subglobose, and the short, very broad leathery leaves, with their raised margins terminating in a sharp mucro, are unlike those of any other species in the genus. Although the flowers closely resemble those of *G. alatus* var. *speciosus* in having the dorsal lobe permanently arched and hooded, and the filaments and style glabrous, they differ from those of all the varieties of *G. alatus* in having the three upper lobes without any claw, the large obovate dorsal lobe tapering a little towards the base but not into a distinct fairly broad claw as in *G. alatus*.

54. **Gladiolus brevītubus** Lewis, comb. et nom. nov.

Tritonia ventricosa Bak., Handb. Irid. 193 (1892), Fl. Cap. 6 : 123 (1896), non Lam. (1786). Type: Cape, Swellendam, Appelskraal near Riviersonderend, Zeyher 3793 (K, lecto.).

Corm small, ovoid, 0.8–1.2 cm diam., with tunics of very fine pale reticulate fibres usually extending 1–3.5 cm above in a thin neck. *Stem* slender, simple, 15–50 cm long. *Leaves* 3, occasionally 4, the lowest $\frac{1}{4}$ to $\frac{1}{2}$ sheathing, the blade linear, erect, usually reaching above the spike, 1–3 mm wide, with slightly prominent midrib and margins; 2 cauline much shorter than the basal, half or more sheathing, the uppermost 1.2–4 cm long, sometimes reduced to a bract-like sheath. *Spike* short, second or subsecund, closely 2–6-flowered. *Bract* green, slightly glaucous, usually with narrow hyaline or purplish margins, inflated, oblong or obovate, subacute, obtuse or subtruncate, often retuse, 1–1.7 cm long, about 1 cm wide; bracteole slightly smaller than bract, usually minutely bidentate. *Flowers* small, 2.5 cm long, actinomorphic or almost so, more or less rotate, pale to deep salmon-pink, orange or brick-red, sometimes yellow in the middle or with a small yellow hastate mark outlined in red on the 3 lower lobes or only the lowest, fragrant. *Perianth tube* 3 mm long, funnel-shaped; *lobes* patent, obtuse, equal and oblong or obovate-oblong, or 3 outer larger than inner and obovate, 1.2–2.2 cm long, 0.6–1 cm wide. *Stamens* arising near base of tube, erect, symmetrically arranged round style or all directed to one side; filaments 3–3.5 mm long, minutely pubescent at the base; anthers linear, 4–5 mm long. *Ovary* rotund or turbinate, 2–2.5 mm long; style reaching shortly above base of anthers, with linear, oblanceolate or spatulate branches 2–5 mm long. *Capsule* subturbinate, shortly 3-lobed at the apex, greenish, thin-walled, about 1 cm long; *seeds* flat, broadly winged, pale reddish brown, oblong or oblong-orbicular, about 5 mm long.

Recorded from the Caledon and Swellendam districts of the southern Cape where it is occasional on mountain slopes up to 1 600 m alt. flowering September to December.

CAPE.—Caledon: Hottentots-Holland Mts, Sugar Loaf, *Phillips*, SAM 70721 (SAM), Somerset, Sneekop, *Stokoe*, SAM 55727 (SAM), Moordenaarskop, *Stokoe*, SAM 60183 (SAM), Kogelberg, *Stokoe*, SAM 54329 (SAM), SAM 56402 (G, SAM), *Jackson* (NBG); Platberg, *Rycroft* 1393 (NBG), *Jackson* (NBG); between Pringle Peak and Voorberg, *Rycroft* 1405 (NBG); Bankrotkloof, between Elgin and Villiersdorp, *Linley*, SAM 59772 (SAM); mountains near Genadendal, *Pappe* (K, SAM), *Roser* (K); near Greyton, *Esterhuysen* 20771 (BOL, NBG); Voëlgat, *Schlechter* 9559 (BM, G, K, Z), Swellendam: Appelskraal, near Riviersonderend, *Zeyher* 3793 (K, SAM); Sonderend Mts, *Barnard* 713 (SAM).

The flowers of this species are among the smallest in the genus and have the shortest tube. It was originally described by Baker as a *Tritonia* but, although it bears some slight superficial resemblance to *T. crocata*, it is now transferred to *Gladiolus* on account of its entirely herbaceous bracts and flattened, broadly winged seeds which are characteristic of this genus and not *Tritonia*. Baker cited two collections, both of which are in Kew Herbarium, and the first, *Zeyher* 3793, is chosen as the lectotype.

The very short-tubed regular, or almost regular, flowers distinguish it from all other species and it has no marked affinity with any. The colouring and scent of the flower are much the same as in *G. alatus*, and the filaments are minutely pubescent at the base as in that species, but the shape and set of the flower are entirely different. As there is a *Gladiolus ventricosus* Lam. (1786) the species requires a new name.

55. *Gladiolus quadrangulus* (Delaroche) Barnard in Jl S. Afr. Bot. **36** : 300 (1970). Neotype: Cape, Cape Flats, Isoetes Vlei, *Goldblatt* 525 (BOL, neo., PRE).

Ixia quadrangula Delaroche, Descr. Pl. Nov. 16 (1766); Burm. Fl. Cap. Prodr. 1. (1768) as '*quadrangularis*'. *Geissorhiza quadrangula* (Delaroche) Ker, Gen. Irid. 88 (1827). Type: Herb. Van Royen (L, 904136–488, holo., PRE photo.).

Ixia linearis L.f., Suppl. 92 (1781). *Gladiolus linearis* (L.f.) N.E. Br. in J. Linn. Soc. **48** : 48 (1928); Lewis in Adamson & Salter, Fl. Cape Penins. 260 (1950). Type: Cape, Cape Flats between Cape Town and Stellenbosch, *Thunberg* 964 (UPS, holo.).

Gladiolus biflorus Klatt in Trans. S. Afr. phil. Soc. **3** : 197 (1885); Bak. Handb., Irid. 207 (1892), Fl. Cap. **6** : 145 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893); non Thunb. Type: Cape, Wynberg district, Cape Flats below Wynberg, *MacOwan* 2279 (SAM, holo., BOL, S) HNAA 279 (B, BOL, G, P, SAM, UPS).

Corm ovoid or subglobose, 1–1.5 cm diam., the tunics often in 2 or 3 imbricate layers, dark or reddish brown, soft, with the upper third to half entire, split up into acuminate teeth below. *Stem* very slender, 15–30 cm high, straight or somewhat flexuose, with 2 basal sheaths (rarely 3), the outer usually hyaline, 1–5 cm long, truncate or obtuse, and inner up to 8 cm, acute, brownish or green, sometimes partly red or purplish and mottled with white. *Leaves* 3, erect, the lowest with a long striate sheath and firm slender blade usually reaching the top of the spike or above, linear with 1 or 2 prominent veins, or thicker and

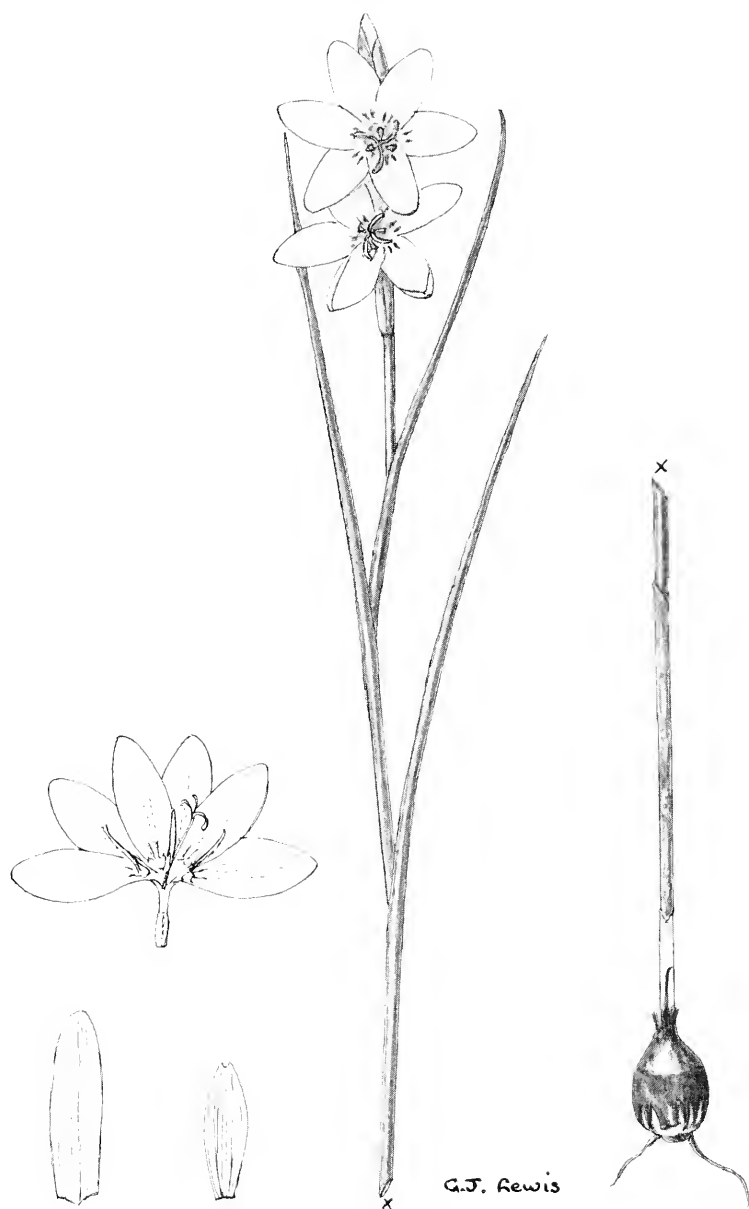


FIG. 32. *G. quadrangulus*.

more or less elliptical in section; 2 upper similar but much shorter. *Spike* laxly or fairly closely 1–7-flowered, usually 2–4. *Bract* lanceolate or oblong-lanceolate, acuminate to subacute, 3–2 cm long (rarely up to 5 cm), firm, many-veined, striate, usually with narrow hyaline or reddish margins; bracteole shorter than bract, acute, obtuse or minutely bidentate. *Flowers* small, actinomorphic, with a short yellow tube and the lobes pale blue, pale lilac or pinkish mauve, sometimes almost white, with small dark or reddish mauve spots at the base, fragrant. *Perianth tube* straight, funnel-shaped, 0.7–1 cm long; *lobes* subequal, oblong, obtuse or subacute, 1.6–2 cm long, 0.7–1 cm wide, or 3 outer sometimes broader than inner, ovate, up to 1.4 cm wide. *Stamens* more or less erect, arising shortly below top of tube, arranged in a circle around style; filaments 3–4 mm long; anthers linear, 6–8 mm long. *Ovary* ellipsoid, 4–6 mm long; style reaching above middle of anthers, with oblanceolate conduplicate branches 3–4 mm long. *Capsule* ellipsoid, 1.3–1.6 cm long, pale creamy brown; *seeds* broadly winged, oblong-ovate or obovate, 4–5 mm long, yellow-brown.

Endemic on the Cape Flats where it was fairly common in the last century, but now rare. It is still plentiful in the Isoetes Vlei Nature Reserve; in wet sandy ground around seasonal pools, flowering August to October.

Fig. 32. From a painting by G. J. Lewis.—Inflorescence; corm and basal sheath; bract and bracteole; flower laid out. Cape.—Cape Flats, Isoetes Vlei, *Lewis* 6225 (NBG). September 1966.

CAPE.—Bellville: Tygerberg, near Duikervallei, *Ecklon* (S). Somerset West: Strand, *Pillans* (U); Sir Lowry's Pass Station, *Guthrie* 2527 (BOL). Stellenbosch: near Bottellary, *Acocks* 603, 4923 (S). Wynberg: Wynberg Flats, *MacOwan* 2279 (S, SAM), HNAA 279 (B, BOL, G, P, SAM, UPS); Cape Flats between Cape Town and Stellenbosch, *Thunberg* 964 (UPS); vlei near Ottery Road, *Dod* 1588 (BM, BOL); vlei near Doornhoogte, *Dod* 516 (BM, BOL, K); Cape Flats Reserve (Isoetes Vlei), *Johns* (NBG), *Lewis* 6225 (NBG), *Barnard*—fruiting—(NBG); *Goldblatt* 525 (BOL, PRE); Cape Flats, *Pappe* (SAM 21366), *Moyle Rogers* (BM), *Stokoe* sub Marloth 11439 (PRE); beyond Uitvlug, *Dod* 1340 (BOL). Without locality: *Bowie* 379 (G); herb. *Burman* (G); *Drège* 8452 (P); *Ecklon & Zeyher* (Z); *Thunberg* (S).

The oldest name for this species is *Ixia quadrangula* Delaroché and typical material is preserved in the Leiden Herbarium. Thunberg and the younger Linnaeus also referred it to the genus *Ixia*, which is not surprising for the small regular flowers with a short straight tube and spreading nearly equal lobes are much more like those of *Geissorhiza* and *Ixia*. However, the comparatively long green bracts and broadly winged seeds are characteristic of *Gladiolus* and this led Klatt to describe it anew as *G. biflorus*. Although the colouring and shape of the flower are different, its corm, leaves and somewhat rigid striate bracts are very similar to those of *G. tenellus* and *G. citrinus* and its affinity is with them. These three species all favour damp situations, often growing in water on the edges of seasonal pools or vleis; two of them have completely regular flowers and those of *G. tenellus* are only slightly zygomorphic. The plant described in the *Flora Capensis* as *Ixia linearis* L.f. by Baker is a true *Ixia* (= *I. capillaris* Thunb.) and bears no resemblance to the *Gladiolus* described here, which Baker included in the *Flora Capensis* as *G. biflorus* Klatt, stating that it

was 'upon the very edge of the genus in the direction of *Geissorrhiza*'. Incidentally, Klatt's name was not legitimate as Thunberg had named a South American plant *G. biflorus* in 1784 (= *Solenomelus biflorus* (Thunb.) Baker).

Klatt considered that this species was allied to *G. orobanche* (= *G. brevifolius*) but it does not even belong to the same group, which has a separate basal leaf produced at a different time from the flowering shoot.

The locality 'near Camps Bay' given by MacOwan for part of his collection No. 2279, may be an error (cf. sheet SAM 21365).

56. ***Gladiolus citrinus*** Klatt in Abh. Naturf. Ges. Halle **12** : 340 et Ergänz. 6 (1822); Dur. & Schinz, Consp. Fl. Afr. **5** : 215 (1893). Type: Cape, between Paarl Mountains and Paardeberg, *Drège* 8457 (B, †, K, lecto., BM, G, L, P). *G. symmetranthus* Lewis in Ann. S. Afr. Mus. **40** : 122 (1954). *G. trichonemifolius* Ker, forma *symmetranthus* (Lewis) Bullock in Curtis's bot. Mag. N.S. 173, t.357 (1960). Type: Cape, Stellenbosch district, near Koelenhof, between Muldersvlei and Stellenbosch, *Lewis* 2237, SAM 60700 (SAM, holo., K, PRE). *Ixia spathacea* Soland. ex Ker, nom. nud.

Corm globose or subglobose, 1–1.5 cm diam., the tunics dark brown with the upper third to half entire, split up into acuminate teeth below, mostly imbricate and rather coarse to somewhat lignified. *Stem* very slender, 6–25 cm long, usually slightly flexuose at the top, with 2 basal sheaths, the outer hyaline, obtuse, 1–3 cm long and inner up to 6.5 cm long, obtuse or acute, greenish at the apex. *Leaves* 3 or occasionally 2, erect, glabrous or minutely hispidulous, the striate sheath of the lowest about half as long as the stem and its rigid subterete 4-grooved blade usually twice as long or more; 1–2 cauline leaves very much shorter and not overtopping the flowers. *Spike* 1–3-flowered, the flowers erect. *Bract* lanceolate or more or less oblong, acute or subacute, firm, striate with many yellowish veins, 2–3 cm long; bracteole like bract but usually a little shorter and obscurely notched at the apex. *Flowers* actinomorphic, funnel-shaped, bright yellow with dark purple-maroon in the throat and tube and the outer lobes sometimes faintly tinged with the same colour. *Perianth tube* straight, funnel-shaped, 1.4–2 cm long; *lobes* subequal, oblong or slightly broader above the middle, obtuse, sometimes obscurely emarginate, 2–3.5 cm long (usually 2.5–3 cm), 1–1.4 cm wide. *Stamens* arising 5–6 mm below top of tube, very shortly exerted, erect, symmetrically disposed; filaments 8–9 mm long; anthers linear, subsagittate, 8–9 mm long. *Ovary* oblong or somewhat urn-shaped, 4–5 mm long; style reaching nearly to top of anthers, with linear or oblanceolate conduplicate branches 4–5 mm long spreading immediately above the anthers and alternating with them. *Capsule* more or less ellipsoid, about 1 cm long, thin-walled; *seeds* oblong-orbicular, broadly winged, pale reddish brown, about 4 mm long.

Recorded only from the Paarl and Stellenbosch districts of the Cape, occasional in marshy ground on sandy flats, flowering August to October.

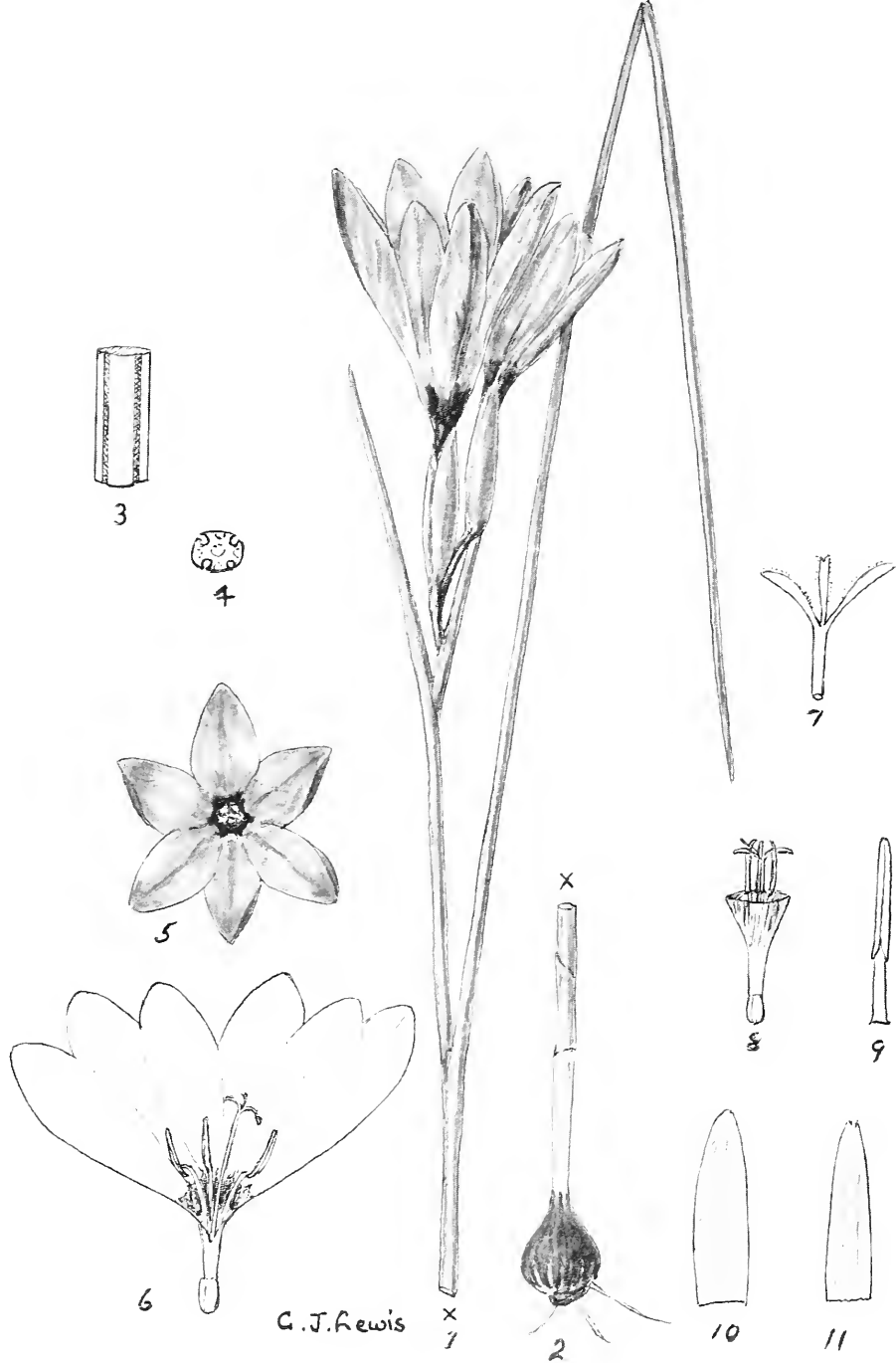


FIG. 33. *G. citrinus*.

Fig. 33. From a painting by G. J. Lewis.—1, Inflorescence and basal leaf; 2, corm; 3, part of leaf, $\times 4$; 4, transverse section of leaf, $\times 4$; 5, flower, front view; 6, flower laid out; 7, top of style and stigmas, $\times 2$; 8, flower cut away to show position of stamens; 9, stamens, $\times 2$; 10, bract; 11, bracteole. Cape.—Stellenbosch, Muldersvlei, *Lewis* 4442 (NBG). August 1962.

CAPE.—Paarl: Between Paarl Mts and Paardeberg, *Drège* 8457 (BM, G, K, L, P, isotypes of *G. citrinus*); Klappmuts, *Schenck* 591 (Z), *Acocks & Hafström* 287 (NBG, PRE). Stellenbosch: Near Koelenhof, between Muldersvlei and Stellenbosch, *Lewis* 2237, SAM 60700 (K, PRE, SAM—type of *G. symmetranthus*), *Leighton* (BOL); Muldersvlei, *Lewis* 4442 (SAM), *Duthie* 940 (BOL); Joostenberg Farm, Muldersvlei, *Thomas* (NBG); Elsenberg, *Grant* 2512 (BOL); near Bottelary road, *Acocks* 2166, 2549 (S); near Stellenbosch, *Letty* 296 (PRE). Without locality: *Masson* (BM); *Oldenburg* (BM).

When this species was described as new in 1954, and named *G. symmetranthus* on account of its completely regular flower, Lewis was unaware that it had already been described and named by Klatt in 1882; his considerably older name must therefore be used for the species. The type, *Drège* 8457 in the Berlin–Dahlem Herbarium, was destroyed in World War II but like most of *Drège*'s specimens this was widely distributed and there are isotypes in Kew and several herbaria in Europe. The one in Kew is now selected as the lectotype.

G. citrinus is very closely allied to *G. tenellus*, with vegetative characters almost exactly as in that species except that the stem is never as conspicuously bent and curved as it sometimes is in *G. tenellus*, and the bract is less acuminate. It differs, however, in having completely regular flowers, somewhat resembling those of a *Crocus* in shape, with a deep purple-maroon stain in the throat and tube. Unlike the slightly zygomorphic flowers of *G. tenellus*, they have no scent and do not remain open at night but close up towards the evening.

In 1960 *G. citrinus* was figured in *Curtis's Botanical Magazine* where it was treated as a form of *G. trichonemifolius* Ker (= *G. tenellus*) by Mr A. A. Bullock, but both Dr T. T. Barnard and Lewis, who had studied the plants in the field in South Africa, considered that it was sufficiently distinct to be upheld as a separate species. Dr Barnard has grown a large number of South African species in Dorset, England, among them *G. tenellus* and *G. citrinus*, and he has stated that both these species breed true from seed. The plants illustrated in *Curtis's Botanical Magazine* were raised by him.

Under *G. citrinus* Klatt cited an unpublished name, *G. odor* Eckl., but the specimens collected by Ecklon and Zeyher and distributed to several herbaria by them with this name are the sweet-scented *G. tenellus*. Another unpublished name, *Ixia spathacea* Soland., which was given to specimens of *G. citrinus* in the Banksian Herbarium collected by Masson and Oldenburg (see note under *G. tenellus*), was cited by Ker when he described *G. trichonemifolius*.

57. ***Gladiolus tenellus*** Jacq., Coll. **3** : 255 (1790), Ic. t.248 (1795); Willd., Sp. Pl. **1** : 209 (1798); Thunb., Prod. 185 (1800), Fl. Cap. **1** : 179 (1811), ed. Schultes 43 (1823); Vahl, Enum. **2** : 81 (1806); Spreng., Syst. **1** : 151 (1825); Ker, Gen. Irid. 137 (1827); Klatt in Linnaea **32** : 705 (1863), pro parte, excl.

G. laevis; Dur. & Schinz, Consp. Fl. Afr. **5** : 225 (1893) excl. ref. Baker et syn. *G. laevis* et *G. thunbergii*. *G. tenellus* var. Jacq., Coll. **4** : 169, t.3 f.1 (1790); Schneevogt, Ic. t.40 (1795). Type: Jacquin, Ic. t.248.

G. tristis vars. *f* and *h.*, *humilis* et *luteus* Thunb., Diss. Glad. 12 (1784). Type: Thunberg, 1075, 1076 (UPS). *G. trichonemifolius* Ker in Curtis's bot. Mag. t.1483 (1812), Gen. Irid. 137 (1827) excl. syn. *Ixia spathacea*; Loudon, Ladies Fl. Gard. Orn. Bulb. Pl. t.13 (1841); Klatt in Linnaea **32** : 707 (1863); Bak., Handb. Irid. 204 (1892), Fl. Cap. **6** : 141 (1896) excl. syn. *G. citrinus* et *Ixia spathacea*; Dur. & Schinz, Consp. Fl. Afr. **5** : 225 (excl. syn. *Ixia spathacea*). Type: Curtis's bot. Mag. t.1483. (There may be a type at BM; cf. notes below.) *G. erectiflorus* Bak. in Fl. Cap. **6** : 146 (1896); non Baker 1895. Type: Cape, sandy places near Malmesbury, MacOwan 1548 (K, holo., BOL). '*G. odoratus* Ecklon' Herb. nom. nud.

Corm ovoid or subglobose, 1–2 cm diam., the tunics dark brown (rarely pale) with the upper third to half entire, split up into acuminate teeth below, usually imbricate and rather coarse to somewhat lignified; roots somewhat swollen and spongy, branched, densely covered with root hairs to which the sand particles adhere. *Stem* very slender, 10–45 cm long, average 15–30 cm, the upper part more or less flexuose or occasionally declinate, with 2–3 basal sheaths, the outer hyaline, obtuse, 1–6 cm long, the inner up to 9 cm, obtuse or subacute, usually grey-green or purplish towards the apex. *Leaves* 3, erect, glabrous or minutely hispidulous, the striate sheath of the lowest half or more the length of the stem, with a rigid slender subterete 4-grooved blade reaching to top of spike or well above it; 2 cauline leaves very much shorter. *Spike* 1–3-flowered, rarely 4. *Bract* lanceolate, acuminate, firm, striate, with numerous yellowish veins, 2.5–5 cm long, rarely slightly longer or shorter; bracteole like bract but usually shorter, sometimes minutely bidentate. *Flowers* erect or sub-erect, somewhat funnel-shaped with the dorsal lobe subarcuate, fragrant, pale or dull to bright yellow, cream or white, usually more or less tinged with purple, mauve or occasionally red outside and with a few fine purple or reddish lines in lower half of 3 lower lobes and often a bright yellow area in the middle, sweetly scented at night. *Perianth tube* slightly curved, 1.3–2.4 cm long, the upper half funnel-shaped; *lobes* oblong or elliptic, obtuse, subobtusate or acute, the 3 upper subequal, 2–4.2 cm long, 0.8–1.6 cm wide; 3 lower as long or nearly as long as upper but narrower and connate for 2–3 mm at the base, sometimes subunguiculate, subequal or the lowest slightly larger than laterals. *Stamens* arising near middle of tube, very shortly exerted, subarcuate; filaments 0.7–1.4 cm long; anthers linear, subsagittate, 0.8–1 cm long. *Ovary* ellipsoid or oblong, 5–6 mm long; style reaching almost to top of anthers or shortly above, with spatulate or oblanceolate conduplicate branches 4–7 mm long.

Recorded from the southern and western Cape districts, fairly frequent on sandy or gravel flats, usually in marshy ground or near seasonal pools, flowering July to October.

CAPE.—Bellville: near Tygerberg, *Harvey* (K), *Gillett* 3113 (K); near Viessershok, *Salter* 3445 (BM, BOL); Klipheuwel, *Lewis* 5603 (NBG), *Martin* 1188 (NBG); 26 km N. of Cape Town on Malmesbury road, *Loubser* 892 (NBG), Bredasdorp: The Poort, near Bredasdorp, *Van Niekerk* 317 (NBG), *Barker* 2519 (NBG); road to Ratel River, *Wasserfall* 371 (NBG); between Langvlei and Mierkraal, *Smith* 3194 (PRE). Caledon: Flats between Viljoen's Pass and French Hoek Pass *Stokoe* (SAM 60159); near Kleinmond, *Topper* 156 (NBG), *Esterhuysen* 2932 (BOL); Caledon, *Zeyher* (K); Kleinrivierskloof, *Zeyher* (BM, K); between Babylon's Tower and Caledon, *Ecklon & Zeyher* 210 (B, C, G, PRE, SAM, Z), s.n. (C, L, P); Klein River Mts, near Stanford, *Linley* (SAM 60134); near Gansbaai, *Kemphorne* (SAM 62789). Cape Peninsula: Melkbosstrand road, *Compton* 18118 (NBG). Ceres: Witsenbergvlakte, *Pappe* (K, SAM); Elandsfontein, 10 km N. of Gydo Pass, *Lewis* 2505, SAM 61812 (K, PRE, SAM); N. of Gydo Pass, *Acocks* 2230 (S), *Maguire* 1795 (NBG); Groenfontein, *Barker* 3052 (BOL, NBG); Cold Bokkeveld, Driefontein, *Marloth* 6140 (PRE); Ertjieslandkloof, *Barker* 3030—partly (PRE). Malmesbury: near Darling, *Hutchinson* 211 (PRE, K), *Bachmann* 628 (Z), *Marloth* 7017 (PRE), *Lewis* 98 (SAM), *Barker* 6765 (NBG); Oudepost, Darling, *Lewis* 2238 (SAM); between Malmesbury and Darling, *Leipoldt*, SAM 55688 (G, SAM); near Malmesbury and Darling, *Leipoldt*, SAM 55688 (G, SAM); near Malmesbury, *MacOwan* HAA 1548 (K—type of *G. erectiflorus*, G, SAM, Z); near Mamre Road Station, *Salter* (SAM 54319); Kalabaskraal, *Barker* 8609 (NBG); Malmesbury road, *Acocks* 2476 (S); Mamre road, 37 km from Cape Town, *Barker* 4092 (NBG); 16 km S. of Malmesbury, *Lewis* 5984 (NBG). Paarl: Klapmuts, *Salter* 3588 (BM, K). Piketberg: Piketberg Range, *Zeyher* 1625 (G, K, P, PRE, S, SAM, Z). Somerset West: Firgrove, *Compton* 13463 (NBG), *Leighton* (BOL 22762, PRE); between Strand and Gordon's Bay, *Parker* 4615 (BOL, K, NBG). Stellenbosch: Stellenbosch, *Sanderson* 943 (K); Stellenbosch Flats, *Garside* 277 (K), *Salter* 8461 (SAM); near Kraaifontein, *Dummer* 112 (BM); near Bottelary road, *Acocks* 2167 (S); Muldersvlei, *Salter* 8462 (SAM). Worcester: Slanghoek valley, *Barker* 9468 (NBG); near Worcester, *Steyn* 203 (BOL, NBG), *Leipoldt* (BOL); between Worcester and Villiersdorp, *Lewis* 2901 (SAM); Botha's Halt, *Van Breda* 606 (PRE), 1145a—partly (PRE). Without locality: *Pappe* (S); *Prior* (BM, K); *Ecklon & Zeyher* (AMD); *Thunberg* (G, LD, S, UPS—nos 1075, 1076 in herb. Thunb.).

There has been confusion about the identity of *G. tenellus* Jacq. since 1896 when Baker described another species under this name in the sixth volume of the *Flora Capensis*. The mistake was only partly rectified by N. E. Brown in 1928, in his paper on the South African Iridaceae of Thunberg's Herbarium (J. Linn. Soc. 48 : 31), for he treated the species described by Baker as new instead of associating it with *G. hyalinus* Jacq. (see note under that species), and also failed to recognize that *G. trichonemifolius* Ker is the same as *G. tenellus* Jacq. The following are his comments on Thunberg's specimens of *G. tenellus*: '2 sheets:—a is, I think, *G. tenellus* Jacq., not *G. trichonemifolius* Ker as named by Klatt, as the petals are not acuminate as in that species. It is also totally different from the plant Baker has placed under the name *G. tenellus* in *Flora Capensis* 6, 141. b is *G. trichonemifolius* Ker.'

When these specimens of Thunberg's were examined in 1949, and again in 1965, it was found that the six plants mounted on the two sheets represented the same species. All have the same rigid, striate, lanceolate bract characteristic of *G. tenellus*, and in fact the plants are so much alike that it is difficult to understand how Brown could have considered them to belong to separate species.

Nevertheless the numerous collections of this fairly common and widespread species made during the past 150 years or more do present a certain degree of variation. The plants are always small, slender and few-flowered, but the stem may be almost straight, as in the plant figured in *Curtis's Botanical Magazine* or remarkably zigzag, even sometimes bent over at a right angle as in the type of *G. tenellus* depicted by Jacquin. The sweetly scented flowers differ in size and colour, as described above, with their lobes rounded or acute at the apex. The

South African plant described by Baker in 1896 as *G. erectiflorus* is a form of *G. tenellus* with finer and more uniformly yellow flowers, and more rounded lobes than usual. (The previous year Baker used the same name for a tropical African species.) White or cream-coloured flowers are commonly found in the southern districts, from Somerset West to Caledon and Bredasdorp, and in the last two districts a dwarf form occurs, usually about 10 to 15 cm in height.

On a sheet in the British Museum there is a single specimen of *G. tenellus* which is possibly the type of *G. trichonemifolius* Ker, but the two specimens on the left, collected by Masson and Oldenburg and named *Ixia spathacea* Herb. Banks (an unpublished name), are *G. citrinus* Klatt.

58. **Gladiolus oreocharis** Schltr. in J. Bot., Lond. **34** : 504 (1896); Bak. in Fl. Cap. **6** : 529 (1897). Type: Cape, Worcester district, Matroosberg, *Marloth* 2265 (B, holo., BOL, GRA, PRE).

Corm subglobose, 1,5–2,5 cm diam. with soft matted tunics of fine pale brown reticulate fibres extending up in a neck 3–4 cm long. *Stem* slender, simple, 30–70 cm high, straight or flexuose, with 1 or 2 membranous basal sheaths up to 10 cm long, obtuse, usually brown at the apex, hyaline below. *Leaves* 3, the lowest with a long striate sheath, usually minutely hispidulous near the base, and linear or linear-lanceolate blade reaching base or top of spike or occasionally a little above, 1,5–5 mm wide, firm or rigid, the margins and 1–3 nerves more or less prominent, occasionally very much raised and the leaf subterete and sulcate; 2 upper much shorter, more than half sheathing, the uppermost 3–6 cm long, sometimes reduced to a bract-like sheath. *Spike* secund or subsecund, 2–8-flowered, rarely 1. *Bract* oblong or oblong-lanceolate, acute or subobtuse, green or brownish green, usually with narrow hyaline margins, occasionally membranous at apex, 1,5–3 cm long; bracteole slightly shorter than bract, minutely bidentate. *Flowers* small, erect, fairly regular, somewhat tubular-campanulate with the dorsal lobe slightly hooded and tips of upper laterals patent, white to pink or mauve with small deep pink or violet diamond-shaped marks—usually yellow inside—near middle of lower lobes, sometimes only on lowest and a small darker blotch on laterals. *Perianth tube* 1,8–3 cm long, straight and slender nearly to the top, then slightly curved and funnel-shaped above; *lobes* acute to obtuse; 3 upper elliptic, oblong or obovate, the dorsal usually slightly larger than laterals, 1,5–2,5 cm long, 0,8–1,5 cm wide; 3 lower subequal, similar to upper but smaller, 1,2–2 cm long, 0,4–1 cm wide. *Stamens* suberect, arising 5–6 mm below top of tube, usually reaching above middle of dorsal lobe but sometimes shorter; filaments 1–1,5 cm long; anthers linear, subsagittate, 5–8 mm long. *Ovary* ellipsoid or rotund, about 3 mm long; style reaching top of anthers or shortly below, with spatulate or obcordate-spathulate branches 3–4 mm long. (See fig. 34.)

A rare montane species endemic in the south-western Cape in the mountain complex around Worcester, Paarl, Ceres and Clanwilliam, at altitudes between

1 700 and 2 200 m, growing in fairly moist areas and flowering in December and January.

CAPE.—Ceres: Bokkeveld Tafelberg, *Esterhuysen* 3969 (BOL, PRE), *Compton* 10086 (NBG). Clanwilliam: Cedarberg, peak S. of Sneeuweb, *Esterhuysen* 7551 (BOL); Krakadouw Peak, *Esterhuysen* 15020 (BOL); Cedarberg, Tafelberg, *Taylor* 1864 (NBG). Paarl: Wemmershoek Peak, *Jackson* (NBG). Worcester: Waaihoek Peak, *Esterhuysen* 8350 (BOL, PRE), 18222 (BOL, K, NBG, PRE); Matroosberg, *Marloth* 2265 (B, BOL, GRA, PRE), 2357 (PRE), *A. Bolus*, herb. Guthrie 3936, 4428 (BOL); Hex River Mts, Buffelshoek Peak, *Esterhuysen* 8399, 8424 (BOL), 24049 (BOL, K); Roodeberg, Hex River Mts, *Esterhuysen* 20902 (BOL), *Stokoe* (SAM 55633); Milner Peak, Hex River Mts, *Esterhuysen* 14233, 14939 (BOL).

Schlechter described this species from a single incomplete specimen received from Dr R. Marloth, who collected it on the Matroosberg in 1895. Since then it has been collected a number of times and it is now possible to add a description of the corm, which was missing from the type, and a more detailed account of the leaves, described as linear-setaceous by Schlechter but usually considerably wider, and the colour and variations in the flowers. The strongly ribbed, narrow, hard leaves, usually minutely scabrid at the base, the soft, fibrous corm tunics and the fairly regular, erect flowers distinguish this montane species. There is a resemblance to the form of *G. inflatus* which tends to produce a more regular perianth but the soft corm distinguishes it from that species. It is related to the variable *G. carneus* but it is a more slender plant with smaller flowers, possibly an adaptation to its montane habitat.

59. ***Gladiolus robertsoniae*** Bolus f. in J. Bot., Lond. **66** : 13 (1928). Type: Orange Free State, near Villiers, *Robertson* (BOL 15053, holo., GRA, K).

Corm subglobose or ovoid, 1.3–2 cm diam., with matted tunics of fine brown reticulate fibres. *Stem* slender, flexuose, 20–45 cm high, usually simple, with 2 sheaths at the base, the outer brown, membranous, soon disintegrating, and inner hyaline, obtuse or subacute, 1.8–8 cm long. *Leaves* 3 (rarely 4), the basal with lower $\frac{1}{4}$ – $\frac{1}{2}$ sheathing, striate, the blade linear, erect or falcate, 10–20 cm long, 1.5–3 mm wide, thin and grass-like with fairly prominent margins and midrib; second similar but much shorter and uppermost 1.5–6.5 cm long, sometimes reduced to an acuminate bract-like sheath. *Spike* secund, fairly closely to somewhat laxly 2–5-flowered. *Bract* oblong or linear-oblong, obtuse or acute, 1.2–2 cm long; bracteole similar to bract and as long or only slightly shorter, minutely bidentate. *Flowers* small, long-tubed, fragrant, mauve or white tinged with pale mauve or lilac, the 3 lower lobes speckled or striped with red or mauve near the base. *Perianth tube* very slender, 2.8–3.8 cm long, slightly curved, the lower $\frac{2}{3}$ subcylindrical and upper third expanded a little towards the throat and slightly constricted just below the lobes; *lobes* elliptic or ovate-elliptic, obtuse, subacute or acute, usually minutely apiculate, the 3 upper 1.5–2 cm long, 1–1.3 cm wide, the laterals slightly smaller than the dorsal; 3 lower projecting a little beyond the upper, up to 2.5 cm long, 6–9 mm wide, connate for 3–5 mm at the base, subequal or the lowest slightly larger than laterals. *Stamens* subarcuate, arising 5–6 mm below top of tube; filaments about 8 mm long; anthers linear, subsagittate, 5–9 mm long. *Ovary* oblong,

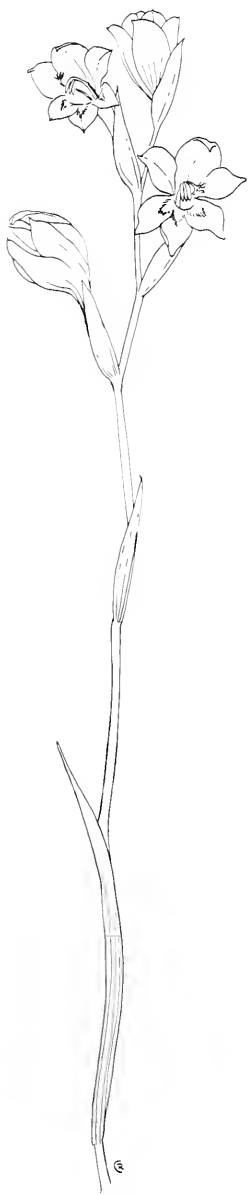


FIG. 34. *G. oreocharis* Schltr.

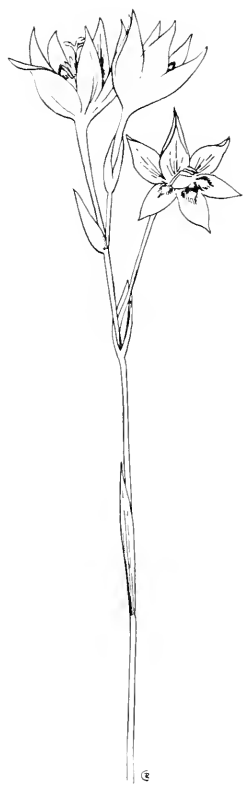


FIG. 35. *G. cylindraceus* Lewis.

about 3 mm long; style reaching to middle or top of anthers or sometimes above, with oblanccolate more or less conduplicate branches 3–4.5 mm long. *Capsule* oblong, 1–1.2 cm long, pallid, thin-walled; *seeds* small, pale brown, somewhat irregularly winged mostly at the top and bottom, more or less oblong, 4–5 mm long.

Occasional on the Highveld of the north-eastern Orange Free State and south-eastern Transvaal on shale slopes in grassveld, flowering from October to December.

TRANSVAAL.—Bethal: Between Leslie and Devon, *Pole Evans* 4246 (PRE, NBG, SAM); 6.5 km west of Morgenon, on shale, *Mauve* 4491 (NBG, PRE). Standerton: near Vaal Station, *Smuts* 390 (PRE). ORANGE FREE STATE.—Frankfort: near Villiers, *Robertson*, BOL 15053 (BOL, GRA, K), *Kresfelder* (PRE).

Until recently very little was known of this distinct species, which was first sent to the Bolus Herbarium in 1916, without any note on its habitat. Since then it has been collected four times, in 1932, 1935 and twice in 1966, on the last occasion very near the type locality. After the good soaking spring rains of 1966, several colonies were observed on grassy shale slopes along the road from Bethal to Morgenon in the southern Transvaal.

It is closely related to the next species *G. cylindraceus* Lewis from the Cold Bokkeveld in the western Cape.

60. *Gladiolus cylindraceus* Lewis sp. nov., *G. robertsoniae* affinis sed folio basali duro cruciformi in sectione transversa, perianthii lobis apiculatis roseis differt.

Cormus ovoideus tunicis fibrosis in collum c.6 cm productis. *Folium* basale scapo paulo brevius subulatum et costatum vel cruciforme in sectione transversa durum ad basin minute puberulum, dimidio inferiore vaginans. *Folia* superiora 2–3, multo reducta vaginantia. *Spica* erecta c.60 cm alta, simplex, 3–8 flora. *Bractea* subnavicularis c.2 cm longa. *Perianthium* tubatum, roseum; tubus angustus cylindraceus 3–4 cm longus, lobis subsimilibus ovatis 2–3 cm longis apiculatis, lobis inferioribus maculatis.

Type: Cape, Ceres district, Hansiesberg, *Jones* (NBG 77085, holo.).

Corm subglobose or ovoid, 1.7–2 cm diam., with tunics of soft brown more or less reticulate fibres extending up in a thin neck. *Stem* slender, simple, straight 30–70 cm long, average 40–55 cm. *Leaves* 3, rarely 4, the lowest usually as long as the stem or longer with the lower $\frac{1}{4}$ – $\frac{1}{3}$ sheathing, striate, the blade subterete and sulcate or linear with very prominent margins and midrib, more or less cruciform in section, 1.5–4 mm wide; second leaf much shorter with a longer sheath and linear or subulate blade up to 10 cm long and uppermost 3.3–8 cm long with a short subulate or acicular adpressed blade, rarely reduced to a bract-like sheath. *Spike* subsecund, fairly closely 4–8-flowered, the flowers erect. *Bract* oblong, ovate-oblong or oblong-lanceolate, 1.5–3 cm long, subacute or obtuse, green or grey-green with narrow hyaline margins; bracteole smaller, bidentate. *Flowers* trumpet-shaped, long-tubed, pale pink or creamy-pink

flushed with salmon-pink, the 3 lower lobes with a small cordate carmine blotch surrounding a yellow spot below the middle, or laterals with a mauve half-moon mark and lowest a yellow arrow-shaped mark outlined in mauve. *Perianth tube* 3–5,5 cm long, slender, subcylindrical, very slightly expanded upwards, usually slightly curved near the top, and constricted just below the lobes; *lobes* spreading abruptly from the tube, subequal, the dorsal suberect, not hooded, and others patent, all acute or the dorsal occasionally subobtusate; 3 upper ovate or ovate-lanceolate, rarely elliptic, subequal or dorsal slightly larger than laterals, occasionally distinctly larger and broadly elliptic, 1,9–3 cm long, 0,9–1,4 cm wide; 3 lower somewhat narrower than upper, 1,7–3 cm long, 5–9 mm wide. *Stamens* suberect, arising about 2–4 mm below top of tube; filaments usually 6–8 mm long; anthers linear, subsagittate, minutely apiculate, 5–8 mm long. *Ovary* rotund, 2–4 mm long; style reaching shortly above base or nearly to top of anthers with spathulate or obcordate-spathulate branches 3–4 mm long. *Capsule* (immature) rotund, about 1,3 cm long, 0,9 cm wide. (See fig. 35.)

Occasional in the Cold Bokkeveld, in the Tulbagh and Ceres districts of the western Cape, on rocky upper slopes and gullies, 1 500–2 100 m alt., flowering from December to January.

CAPE.—Ceres: Hansiesberg, *Jones* (NBG 77085), *Williams* 1166 (NBG); Skurfdeberge, near Gydo, *Bolus* 6687 (BOL); Neethlingsberg, Witsenberg, *Esterhuysen* 22503 (BOL); Witsenberg, *Jackson* (NBG), Mostertshoek Twins, *Wasserfall* 797 (BOL, NBG), *Esterhuysen* 9826 (BOL, K, PRE). Tulbagh: Sneecgat Peaks, *Esterhuysen* 19840 (BOL, K); Little Winterhoek, near Tulbagh, *Marloth* 491 (PRE).

The species is allied to the previous species, *G. robertsoniae* L. Bolus, but is a more robust plant with hard sclerotic leaves. This type of delicate trumpet-shaped, long-tubed, fairly regular perianth is also seen in *G. lapeirousioides*, *G. bilineatus*, *G. leptosiphon* and *G. leptosiphon*.

61. **Gladiolus debilis** Ker in Curtis's bot. Mag. t.2585 (1825). Type: Curtis's bot. Mag. t.2585.

Common name: Painted Lady.

Corm ovoid 1–2,5 cm in diam. with pale brown wiry tunics becoming reticulate above the middle or, in the vars. *cochleatus* and *variegatus*, with hard woody clawed dark tunics. *Stem* slender simple flexuose, 30–65 cm long. *Leaves* with the lowest well developed, sheathing at the base, the long linear blade usually overtopping the stem, 1–1,5 mm wide, with more or less thickened margins and midrib; 3 (rarely 2) upper leaves shorter, the uppermost 2,5–4,5 cm long. *Spike* short, 1–4-flowered, rhachis flexuose. *Bracts* oblong or obovate-oblong, 1,4–2 cm long, obtuse or subacute, somewhat inflated, grey-green, striate. *Flowers* small somewhat trumpet-shaped, white with red dots in throat and a few small dots and lines in a pattern near base of lobes, occasionally pale pink and the blotches irregularly placed and the tube dark blood red. *Perianth tube* straight, subcylindrical or very narrowly funnel-shaped 1–2 cm long; lobes patent, the 3 upper ovate, subequal, 1,5–3,5 cm long, obtuse or subacute; the

3 lower fairly similar to upper but slightly smaller. *Stamens* erect, arising within the throat; filaments 3–15 mm long, anthers linear 4–6 mm. *Capsule* oblongo-ellipsoid, c. 17 mm long, chartaceous; seeds ellipsoid, 8 mm long, with a broad wing.

A mountain inhabitant found on the Hottentots-Holland and adjoining mountain ranges as far as Worcester in the southern Cape, eastwards as far as Caledon and Bredasdorp; occasional on slopes up to 1 600 m alt., flowering from September to October, occasionally November.

Three varieties are recognized.

KEY TO VARIETIES

- Perianth lobes patent, the dorsal not hooded; stamens with filaments 3–5 mm long; corm with light fibrous tunics (a) var. *debilis*
- Perianth with dorsal lobe hooded, suberect or projecting forward; stamens more or less arcuate, the filaments 0.8–1.5 cm long; corm with hard woody clawed tunics:
- Leaves 4; perianth tube white, pink or pale red and lower lobes often with spade-shaped red markings or other distinct patterns; filaments 0.8–1 cm long (b) var. *cochleatus*
- Leaves 3; perianth tube dark red or purplish and lower lobes with dark blood-red or purplish spots and streaks not arranged in a pattern; filaments 1.2–1.5 cm long (c) var. *variegatus*

(a) var. *debilis*

G. debilis Ker in Curtis's bot. Mag. 2585 (1825); Klatt in *Linnaea* **32** : 705 (1863); Bak. in J. Linn. Soc. **16** : 174 (1877), *Handb. Irid.* 207 (1892), *Fl. Cap.* **6** : 145 (1896); Dur. & Schinz, *Consp. Fl. Afr.* **5** : 216 (1893). Type: Curtis's bot. Mag. t.2585.

Geissorhiza albens E.Mey. (in herb. Drège) nom. nud.; Bak. in J. Linn. Soc. **16** : 174 (1877).

What is now considered to be the smallest and weakest of three varieties of this delicate small-flowered species was figured in *Curtis's Botanical Magazine* in 1825, where it was described by Ker as a 'very delicate feeble-stemmed plant' and consequently named *G. debilis* by him. The flower has a short, straight and almost cylindrical tube with all six lobes spreading out flat from the top, the dorsal one not hooded and the lower ones with small red marks at the base, and very short erect stamens. The unusual shape of the flower no doubt accounts for the name *Geissorhiza albens* being given by Meyer to plants collected by Drège in Dutoitskloof. Specimens with this unpublished name were distributed to several herbaria and it was cited as a MS. name under *Gladiolus debilis* by Baker.

This variety occurs on the mountain ranges running from north to south between Bain's Kloof in the Worcester district and the vicinity of Hangklip in the Caledon district. On the Cape Peninsula and in other parts of the Caledon district the species is represented by the better known var. *cochleatus* and the differences between them are discussed under that variety.

CAPE.—Caledon: Hottentots-Holland Mts, Sugar Loaf, *Phillips* (SAM 70661); Sir Lowry's Pass, *Acocks* 2179 (S); Sir Lowry's Pass—Palmiet River, *Penther* 568 (S, Z); Grabouw, *Andrae* 1060 (PRE); Kogelberg Reserve, *Grobler* (PRE 23237); Viljoen's Pass, *Gillett* 4451 (BR); Houhoek Mt., *Schlechter* 5472 (Z); Elgin, Highlands Estate, *Lewis* 2007 (SAM); between Viljoen's Pass and French Hoek Pass, *Davis* (SAM 60219); Nuweberg, *Bond* 484 (NBG); Harold Porter Reserve, Betty's Bay, *Topper* 176 (NBG). Paarl: Dutoitskloof, *Drège* 1568 (P), Kleinriviersberg, *Drège* 3983 (SAM) s.n. (BM, CGE, G, K, L, P, SAM—all *Geissorhiza albens* E. Mey. MS.), *Esterhuysen* 15726 (BOL), *Linley* (SAM 59746), *Horrocks* 68 (NBG), *Loubser* 480 (NBG); French Hoek Pass, *Sidey* 1870 (S), *Phillips* 1318 (SAM); French Hoek Peak, *Compton* 18560 (NBG); Wemmershoek Mts, *Wasserfall* 481 (NBG). Stellenbosch: Jonkershoek valley, *Lewis* 1659 (BOL, SAM). Wellington: W. side of Bain's Kloof, *Lewis* (BOL); Wellington Mt., Suurvlakte, *Marloth* 59 (PRE). Worcester: Baviaanskloof, *Leighton* 1360 (BOL); Bain's Kloof, *Compton* 18617 (NBG), *Kies* (PRE), *Lindeberg* (S), *Schelphe* 4165 (BM). Without locality: *Masson* (BM); *Bowie* (BM—with locality 'Swellendam').

(*b*) var. **cochleatus** (Sweet) Lewis stat. nov.

G. cochleatus Sweet, Brit. Fl. Gard. ser. 2, t.140 (1832), Ornam. Fl. Gard. 4 : t.231 (1854); Bak. in J. Linn. Soc. **16** : 174 (1877), Handbk. Irid. 208 (1892), Fl. Cap. **6** : 146 (1896); Klatt, Ergänzt. 8 (1882); Dur. & Schinz, Consp. Fl. Afr. **5** : 215 (1893). *G. debilis* sensu Baker, pro parte, Fl. Cap. **6** : 145; Marloth, Fl. S. Afr. 4 : t.47 c. (1915); L. Bolus, Barclay & Steer, First Book S. Afr. Flrs t.150 (1928); Lewis in Adamson & Salter, Fl. Cape Penins. 258 (1950); Kidd, Wild Flrs Cape Penins. t.65 f.9 (1950); Rice & Compton, Wild Flrs Cape of Good Hope t.204 f.1 (1951). Type: Sweet, Brit. Flower Garden, ser. 2, t.140. *G. lambda* Klatt in Linnæa **32** : 708 (1863), Ergänzt. 8; Bak. Handbk. Irid. 204, Fl. Cap. **6** : 143; Dur. & Schinz, Consp. Fl. Afr. **5** : 219. Type: South Africa, without locality, *Reynaud* (B, holo, †, S. lecto).

Waitzia hastulifera Herb. Lübeck, ex Klatt, Ergänzt. 8, nom. nud.

Corm as in var. *debilis* but the tunics harder, evenly cut up from the base into acuminate lignified teeth, connate above the middle and sometimes with a fringe of bristles at the top. *Stem*, *leaves* and *spike* as in var. *debilis*; leaves 4, the lowest occasionally up to 2 mm wide. *Flowers* slightly larger, suberect with the dorsal lobe hooded and suberect or projecting forward, white or occasionally pale pink, with red markings at throat and in various patterns on lower half to two-thirds of 3 lower lobes, often somewhat spade-shaped on the lobes. *Perianth tube* as in var. *debilis* but longer, 1,7–2 cm, sometimes slightly curved, white or pale red; *lobes* obtuse or subobtuse, the 3 upper obovate or suborbicular, rarely ovate, the dorsal slightly larger than laterals, 2–2,8 cm long, 1,3–2 cm wide; 3 lower subequal, more or less oblong or obovate-oblong, 1,8–2,4 cm long, 0,8–1,3 cm wide. *Stamens* subarcuate, arising shortly below top of tube; filaments 0,8–1 cm long; anthers 7–8 mm. *Gynæcium* as in var. *debilis* but ovary 4–5 mm long and style branches 2,5–4 mm long.

This variety is found in the southern Cape, from the Cape Peninsula to Bredasdorp, fairly frequent on rocky mountain slopes and plateaux, flowering from August to November.

CAPE.—Bredasdorp: Baardskeerderbos, *Barker* 2463 (NGB). Caledon: near Houhoek, *Bolus* s.n. (BOL), *Wilman* 780 (BOL); Swartberg, near Spring, *Templeman*, herb. MacOwan HAA 280 (BM, BOL, G, K, P, UPS), herb. MacOwan 2610 (S, SAM); mountain above Betty's Bay, *Esterhuysen* 31416 (NBG); Platberg, *Jackson* (NBG); near mouth of Palmiet River, *Gillett* 4234 (BOL); Babylon's Tower, *Ecklon* & *Zeyher* (BM, K); Shaw's Pass, *Barker* 15 (BOL, K), *Martin* 1161 (NBG), *Lewis* 6095

(NBG); Klein River Mts, Zeyher 3988 (K, P, S, PRE, SAM); ditto, E. of Rocklands Peak, Stokoe (SAM 55717); Voëlkop, near Hermanus, Barker 1794 (NBG); Genadendal, Pappe (SAM), Prior (K), Kogel (B), Roser (PRE), Galpin 4723 (PRE). Cape Peninsula: near Camps Bay, Letty 162 (PRE); Elsie's Peak, Dod 2989 (K), Salter 335/5 (BM); Constantiaberg, Schlechter 430 (G, LE, P, Z); Steenberg, Sidesy 2193 (S); Tokai, Compton 17452 (NBG); Muizenberg Mt., Fair, herb. Dod 1767 (BM, BOL, K); Kalk Bay Mt., Garabedian (SAM 51800), Barker 4894 (NBG); mountains near Simonstown, Bolus 4949 (BOL, K), Wright 251 (P); Redhill, Compton 13789 (NBG), Leighton (BOL 22763); Swartkop, Salter 7710 B (SAM); Bonteberg, Barker 813 (NBG). Without locality: Kolbing 27 (LE).

In 1832 *G. cochleatus*, the 'Spoon-lipped Corn-flag', was described and figured by Sweet as a separate species, closely related to *G. debilis*. In his type figure the flower is inverted, as occasionally happens when the stem is bent over, and Sweet described the dorsal lobe as the lowest and vice versa, referring to the dorsal as 'The hollow spoon-shaped lower segment of the flower'.

Baker maintained *G. debilis* and *G. cochleatus* as separate species in the *Flora Capensis* but from his descriptions and the specimens he cited under them it is evident that he confused the two (under the former he also cited Thunberg's *Ixia linearis* which is *Gladiolus linearis* (L.f.) N.E. Br., and now *G. quadrangulus* (Delaroché) Barnard, an entirely different plant). Since the publication of the *Flora Capensis* South African botanists have been uncertain about their identity and both have been named *G. debilis* in this country. After making a more thorough study of them Lewis considered that they are too closely allied to be upheld as separate species and that *G. cochleatus* should be treated as a variety of *G. debilis*.

The vegetative characters are the same in both except that the corm tunics are harder and more lignified in var. *cochleatus*, and its bracts usually slightly larger. Its flowers also are slightly larger and less erect, the tube sometimes somewhat curved, and the dorsal lobe more rounded, distinctly concave or hooded and suberect or projecting forward. The stamens, with slightly longer filaments and anthers, are more or less curved under the dorsal lobe, and the three lower lobes are conspicuously marked with red in various patterns. There is a good photograph of specimens of this variety in L. Bolus, Barclay & Steer's *First Book of South African Flowers*, where it was named *G. debilis* and described by Dr L. Bolus as: 'Occasionally with pale pink flowers but usually of an ivory whiteness, printed on the lower segments with spade-shaped markings in crimson and dashes of faint yellow between them. Sometimes the pattern is more or less indefinite, and the crimson splashed in varying degrees of intensity.'

Baker included *G. lambda* Klatt in the *Flora Capensis* although he did not see the type, an unlocalized collection of Reynaud's in the Berlin Herbarium, and the species was known to him only from the somewhat inadequate description from which it could not be identified. Like many other types in the Berlin-Dahlem Herbarium this one was destroyed during World War II, but in Klatt's private herbarium in the Stockholm Natural History Museum Herbarium there is a single well-preserved flower named *G. lambda* by him which is the same as *G. cochleatus*, so Klatt's name now falls into the synonymy under this variety.

(c) var. **variegatus** Lewis var. nov. a var. *typica* foliis 3 non 4, perianthii tubo et maculis loborum inferiorum atrosanguinibus, staminibus longioribus differt. Type: Cape, Bredasdorp district, Brandfontein, *Esterhuysen* 19087 (BOL, holo., NBG, PRE).

Differs from vars. *debilis* and *cochleatus* in having 3 instead of 4 leaves, in the markings of the flowers and in having longer stamens, the filaments 1,2–1,5 cm long and anthers 0,8–1 cm.

Corm with tunics as in var. *cochleatus* but darker brown, sometimes almost black. *Leaves* 3, as in var. *debilis* but lowest sometimes shorter and not reaching top of stem. *Bract* longer and narrower than in var. *debilis*, 2,5–3,5 cm long, not inflated and not, or scarcely, striate. *Flowers* as in var. *cochleatus*, sometimes slightly larger with lobes up to 3 cm long, white with the tube dark blood-red or purplish and lower lobes marked to well above middle with large spots and streaky blotches of the same colour, not forming any definite pattern. *Stamens* subarcuate, arising about 5 mm below top of tube; filaments 1,2–1,5 cm long; anthers 0,8–1 cm.

This variety is found in the southern parts of the Caledon and Bredasdorp districts in the southern Cape, occasional, confined to pockets in limestone ridges, flowering from September to October.

CAPE.—Bredasdorp: Brandfontein, *Esterhuysen* 19087 (BOL, NBG, PRE); near Cape Agulhas, *Nordenstam* 1455 (NBG). Caledon: Grootbos, off Stanford-Gansbaai road, *Chater* (NBG); between Gansbaai and Danger Point, *Stokoe* (SAM 55623).

This distinct variety has a very different habitat from the others, being confined to limestone ridges in the southern parts of the Caledon and Bredasdorp districts. It differs from both in having only three leaves instead of the normal four, and from var. *debilis* it is well distinguished by its larger flower, hooded dorsal lobe and considerably longer arched stamens. It comes nearer var. *cochleatus* but besides having slightly longer and narrower bracts and larger flowers with longer stamens, it is readily distinguished by its dark blood-red or purplish perianth tube and the markings of the same colour on the three lower lobes. In this variety they extend well above the middle of the lobes and are in the form of large spots and irregular striped blotches, as if carelessly splashed on, in contrast to the neat artistic designs of var. *cochleatus*.

62. **Gladiolus longicollis** Bak. in J. Bot., Lond. **14** : 182 (1876). Type: eastern Cape, Umtata district, Baziya Mountains, *Baur* 505 (K, holo., PRE, photo.).

Solitary plants 40–80(–100) cm high. *Corm* globose to ovoid with tunics of clawed wiry parallel fibres reticulated when still entire above; producing sessile cormlets inside the fibrous mantle. *Leaves* reduced, sheathing the scape; with 2 basal membranous truncate prophylls; the lowest leaf usually the longest but often short (it may reach the spike or overtop it if the flowering period is

late); free for $\frac{1}{4}$ to $\frac{3}{4}$ of its length, linear to linear-subulate, up to 75 cm long and 2–5 mm broad, costate, apex spinescent; 2 upper leaves reduced, closely ribbed, sheathing with short free blades reaching the base of the spike, the lower often enveloping the upper nearly to the top. *Spike* 1–3(–4)-flowered, if several-flowered flowers secund, laxly spaced with the rhachis flexuose. *Bracts* linear-oblong, 3–5 cm long, forming a close fitting cylinder around the perianth tube, apex obtuse to acute, green, faintly striate. *Flower* fragrant in the evening, tubular below with the limb shallowly campanulate to trumpet-shaped, fairly regular, white cream or yellow often with dark reddish brown or purple spotting and dark median lines, the throat sometimes greenish; *perianth tube* curved or straight, narrowly tubular, somewhat widened at the throat and slightly constricted at the top, then expanded to form a spreading limb; length of tube varying from about as long as the limb to much longer, 4–12 cm; *lobes* varying in shape, lanceolate to ovate, 2.5–4 cm long, with the apex acute to long tapered, margin sometimes involute; the outer lobes often with longer acuminate apices in the var. *platypetalus*, the dorsal lobe widest, often slightly hooded, the other 5 spreading. *Stamens* arising below top of tube, partly included; filaments 2–7 mm long, anthers *c.* 12 mm long, subsagittate. *Capsule* ellipsoid, *c.* 2.5 cm long, pallid, thin walled; *seeds* broadly winged, oblong-orbicular, 7–8 mm long, pale yellow brown.

Widespread in the eastern Cape Province, Natal, Lesotho, eastern Orange Free State, Swaziland and eastern Transvaal; scattered and fairly frequent locally in montane grasslands in moist areas at altitudes up to 3 300 m, flowering from August to February, usually October to December.

Two varieties are recognized.

KEY TO VARIETIES

- | | | | | |
|---|----|----|----|------------------------------|
| Perianth tube under 6 cm long; lobes equal, often tapered | .. | .. | .. | (a) var. <i>longicollis</i> |
| Perianth tube over 6 cm long; lobes usually fairly short and acute, outer often longer than inner | .. | .. | .. | (b) var. <i>platypetalus</i> |

(a) var. *longicollis*

G. longicollis Bak. in J. Bot., Lond. **14** : 182 (1876), in J. Linn. Soc. (Botany) **16** : 173 (1877); Ingram in Gard. Chron. ser. 3, **88** : 301 (1930), in Gard. Chron. ser. 3, **90** : 346 (1931); Lewis in Jl S. Afr. Bot. **7** : 26 (1941). Type: eastern Cape, Umtata district, Baziya Mountains, *Baur* 505 (K, holo., PRE, photo.).

G. tristis sensu Bak. in Saund., Ref. Bot. **1** : t.23 (1869) excl. syn.; non Linn. 1763. *G. cygneus* Ingram in Gard. Chron. ser. 3, **90** : 347 cum fig. (1931). Type: Natal, Drakensberg, Mont-aux-Sources, *Ingram* (BM, holo.).

Acidanthera longicollis (Bak.) Foster in Contr. Gray Herb. **114** : 42 (1936).

The typical variety possesses a curved perianth tube about as long as the limb and the lobes have tapered apices. It is more or less confined to the eastern Cape, Natal, and parts of Lesotho.

Lewis recognized two species and a variety in this taxon, viz. *G. longicollis* Bak. with a short tube and attenuated lobes and *G. platypetalus* (Bak.) Lewis (*Acidanthera platypetala* Bak.) with a fairly long tube and short, acute lobes; her species *G. praelongitubus* she reduced to a variety of *G. platypetalus*. A survey of the ample material failed to show a distinct separation between these two concepts, morphologically or geographically. The variability of the length of the tube and the tapering of the lobe-apices is a common phenomenon in the genus.

CAPE.—Albany: Hills around Grahamstown, *Galpin* 196 (K, PRE); Grahamstown, *MacOwan* s.n. (K) *Dyer* 1649 (GRA). Bathurst: Great Fish River, between Kaffir Drift and Governor's Kop, *Ecklon & Zeyher* 170 (B, G, LD), s.n. (P); road from Port Alfred to Three Sisters, *Britten* 723 (GRA). King William's Town: near Kei road, *Ranger* 252 (PRE), *Sim* 1434 (PRE); Izelini, *Sim* 19924 (PRE); Murray's Krantz, *Pirie, Schnell* (BOL 22761). Komga: near Komga, *Flanagan* 1095 (BOL, GRA, K, PRE, SAM). Middelburg: Gordonville, *Snecuberge, Acocks* 16530 (K, PRE). Mount Currie: near Kokstad and Suurberge, *Tyson* 1874 (BOL, GRA, K, PRE, SAM); near Kokstad, *Tyson* 1536 (BOL, GRA, SAM). Port Elizabeth: Port Elizabeth, *Holland* (BOL 27916). Qumbu: Ntabadule Highlands, *Acocks* 13837 (K, PRE). Somerset East: Bosberg, *MacOwan* 321 (BOL, GRA), s.n. (BM, K, S, SAM, Z). Stockenström: foot of Elandsberg, *Cooper* 220 (K); Gaika's Kop, Katberg, *Moss* 15026 (BM), *Grant* 3056 (BOL, PRE), *Rattray* (BOL 15786). Uitenhage: Winterhoek Mts, Hells Gate Kloof, *Fries, Norlindh & Weimarck* 1038 (LD). Umtata: Baziya Mts, *Baur* 505 (BOL, K); near Umtata River mouth, *Reynolds* 3038 (BOL, PRE).

LESOTHO.—Leribe, *Dieterlen* 232 (K, PRE, SAM); Qacha's Nek, *Fawkes* 352 (NBG), *Jacottet* 89 (G); Pone Valley, *Coetsee* 825 (PRE); Mahlasas, *Jacot Guillarmod* 95 (PRE); without precise locality, *Cooper* 3192 (K); *Staples* 44 (PRE).

ORANGE FREE STATE.—Bloemfontein: Bloemfontein, *Potts* 7472 (BLFU). Ficksburg: Ficksburg, *Galpin* 13839 (BOL, K, PRE), *Fawkes* 212 (NBG). Ladybrand: Appledore, Kommissiepoort, *Tylden* 5 (NBG). Vrede: Vrede, *O'Meara*, NBG 2045/33 (BOL). Zastron: Zastron, *Maree* 59 (PRE).

NATAL.—Bergville: Mont-aux-Sources, *Ingram* (BM—type of *G. cygneus*), *Flanagan* (BOL 27913), *Schweickert* 722 (PRE); Cathedral Peak, *Edwards* 1188 (PRE), *Killick* 1536 (K, PRE); Organ Pipes Pass, *Schelppe* 491 (PRE); Sentinel Peak, *Schelppe* 3050 (BM); Tugela River valley, *Lanjouw* 1033 (U); *Hafström & Acocks* 296 (PRE, S). Estcourt: Giant's Castle, *A. Bolus*, herb. Guthrie 4930 (BOL); *Symons* 52 (PRE); Estcourt, *West* 411 (PRE); near Estcourt on Weenen road, *Acocks* 10710 (BR, PRE); Mooi River, *Mogg* 3107, 3244 (PRE). Lions River: Everglades, *Moll* 1272 (PRE). Pietermaritzburg: Balgowan, *Mogg* 5577 (PRE). Underberg: 9–16 km S.W. of Underberg, *Dyer* 3247, 3259 (PRE). Weenen: 104 km N. of Pietermaritzburg, *Rogers* 28152 (Z); Mnweni area, *Esterhuysen* 18676 (BOL). WITHOUT LOCALITY: *Hutton* (K); *Prior* (Z).

(b) var. **platypetalus** (Bak.) Oberm., stat. et comb. nov.

Acidanthera platypetala Bak. in J. Bot., Lond. **14**: 339 (1876), in J. Linn. Soc. **16**: 160 (1877), Handb. Irid. 186 (1892), in Fl. Cap. **6**: 131 (1896). Lewis in Jl S. Afr. Bot. **7**: 26 (1941). Type: Natal, Attercliffe, *Sanderson* 265 (K, lecto., PRE, photo.).

G. praelongitubus Lewis in Jl S. Afr. Bot. **7**: 27 (1941). Type: Transvaal, Barberton, *Galpin* 530 (SAM, holo., PRE).

This variety with its characteristic long tube and often longer outer lobes has more or less the same distribution as the typical variety but spreads further northwards to the Transvaal where it replaces the typical variety. The tube in these northern parts may reach a length of 12 cm, the longest tube in the genus as far as we know.

CAPE.—Butterworth: near Butterworth, *L. E. Taylor* 3648 (NBG). East London: Kidd's Beach, *Bokelmann* (NBG); Nahoon, *Pamphlett* 122 (NBG); East London, *Rattray* 832 (GRA). Lusikisiki: Mkambati, near Umtentu River, *Mara's* 1202 (GRA, K, NBG, PRE), *Hone* 32 (PRE). Port St. Johns: Port St. Johns, *Baker*, sub TRV 1488 (PRE).

NATAL.—Camperdown: Inchanga, *Wood* 6538 (BM), *Molyneux* (BM); Camperdown, *Rehmann* 8966 (Z); Cato Ridge, *Fairall* 20 (NBG). Durban: Port Natal, *Sanderson* 16 (K); near Durban, *Wood* 108 (BM, K, SAM); The Bluff, *Langoue* 1074 (U); Clairmont, *Wood* 4655 (G); 10489 (BOL, G, PRE); Umbogintwini, *Salter* 382/26 (BM). Hlabisa: St. Lucia, *Pole Evans* 3659 (K, PRE), *Crundall* (PRE). Inanda: Inanda, *Wood* 232, 243 (K). Lions River: Karkloof, *Symons* (SAM 11370). Newcastle: Newcastle, *Wilms* 2290 (BM). Umvoti: Greytown, *Wylie* (K), Umzinto: Dumisa, *Rudatis* 430 (BM, G, K, L, S, Z). Utrecht: Nauwhoeck district, *Devenish* 784 (K, PRE). Without precise locality: *Gerrard* 547 (BM, K); *Sanderson* 265 (K); *Wahlberg* (S); *Saunders* (BOL).

LESOTHO.—Butha Buthe, *Jacot Guillarmod* 4155 (PRE); Mtibokho Valley, *Jacot Guillarmod* 292 (PRE). ORANGE FREE STATE.—Bethlehem: Top of pass between Kestell and Golden Gate, *Lewis* 6156 (NBG). Harrismith: Harrismith, *Sankey* (K); Rensburgskop, *Jacobsz* 189 (PRE). Heilbron: Viljoensdrif, *Burt* *Davy* 7006 (PRE).

TRANSVAAL.—Barberton: Barberton, Saddleback Range, *Galpin* 530 (BOL, K, PRE, SAM); Nels-hoogte Forest Reserve, *Germishuizen* 91 (PRE); Berlin, Godwan River, *Hofmeyr* 76 (PRE); Schagen Mt., *Liebenberg* 2837 (PRE). Belfast: Belfast, *Strey* 3425 (K, PRE); 5 km W. of Belfast, *Codd* 5765 (PRE); Dullstroom, Suikerboskop, *Galpin* 13177 (K, PRE), s.n. (BOL). Bethal: Bethal, *Leendertz* sub TRV 9338 (PRE). Carolina: Carolina, *Rogers* 19663 (K), *Galpin* 12373, 12527 (PRE); Waterval-Boven, *Mason* (K); Badplaats, *Bayliss* 2499 (NBG). Ermelo: Lake Chrissie, *Hamilton* (PRE 4293); Nooitgedagt, *Henrici* 270 (PRE). Groblersdal: near Monsterbus P.O., *Acocks* 20881 (K, PRE). Krugersdorp: near Krugersdorp, *Murray* 684 (PRE), *Gilliland*, herb. Moss 27370 (BOL). Letaba: Near Magoe-bakloof, *Codd & De Winter* 3072 (PRE), *Dyer* 4396 (PRE). Lydenburg: Lydenburg, *Wilms* 1447 (AMD, BM, K); Kemp Heights, 24 km S.E. of Lydenburg, *Codd* 8041 (K, L, PRE); Brooklands, Mt. Anderson, *Leighton* 3271 (BOL). Middelburg: Middelburg, *Prosser* 1046 (K, NBG, PRE), *Jenkins* sub TRV 9123 (L); Witpoortjieklouf, Moss 13509 (BM, PRE). Nelspruit: Devils Kantoof, Kaapsehoop, *Pole Evans* 958 (K, PRE), *Phillips* 3459 (K, PRE); Sabie River road, near White River, *Holt* 338 (K, PRE). Pietersburg: near Haenertsburg, *Hafström & Acocks* 295 (PRE, S); Blouberg, *Codd & Dyer* 9047 (K, PRE). Piet Retief: Piet Retief, *Galpin* 9386 (K, PRE); Iswepe district, *Sidey* 1536 (PRE, S, SAM). Pilgrim's Rest: Graskop, *Galpin* 14571 (PRE), *Prosser* 2056 (PRE); Pilgrim's Rest, *Rogers* 23158 (K). MacMac Falls, *Codd* 6752 (K, PRE), *Smuts & Gillett* 2252 (PRE); Mauchsberg, Sabie, *Smuts & Gillett* 2302, Sabie, *Rogers* 18327 (Z). Potgietersrus: Pyramid Estate, near Potgietersrus, *Galpin* 9158 (PRE). Soutpansberg: Sibasa Mt., N. of Pepiti, *Smuts & Gillett* 3280 (PRE); Hangklip, Louis Trichardt, *Bremekamp & Schweickardt* 434 (PRE). Wakkerstroom: Oshoek, *Devenish* 152 (PRE).

SWAZILAND.—Mbabane: Ukutula, *Compton* 24558, 25185 (NBG); Miller's Falls, *Compton* 26192 (NBG); Dalriach, near Mbabane, *Bolus* 12339 (BOL). Pigg's Peak: Havelock Mine, *Miller* 3031 (PRE).

Three collections from the eastern Cape: Somerset East, namely *Sidey* 745 (PRE), and *Acocks* 13648 (PRE), both from 4 km S.W. of Suurberg Post Office, and *Long* 1234 (PRE) from Suurberg Sanatorium, were collected in April whereas *G. longicollis* flowers in spring. As they bear a fairly long basal leaf which seems to exclude them from *G. maculatus* Sw., Lewis preferred to place them under *G. longicollis*. They need further investigation.

63. *Gladiolus tristis* L., Sp. Pl. ed. 2 : 53 (1762). Type: LINN 59.9, (holo.).

Common names: Marsh Afrikaner, Vlei-aandblom, Reeboekblom.

Corm subglobose, 1–3 cm diam., with brown or reddish brown tunics varying from soft, submembranous and entire to coarse or more or less lignified and cut up into narrow acuminate teeth, usually producing numerous sessile cormlets. *Stem* simple, moderately slender, firm, 40 cm to 1.5 m high, average 50–70 cm, with 2 basal sheaths, the outer hyaline, sometimes brown at apex, obtuse, 2.5–7 cm long, inner up to 15 cm, acute or acuminate, partly green or brownish, glabrous or minutely hispidulous. *Leaves* 2–4, the lowest usually nearly as long as the stem or a little longer, with a short striate sheath and linear blade 1.5–5 mm wide, with very prominent midrib and margins, more or less cruciform in section, usually spirally twisted towards apex; second with

a longer sheath and shorter blade and third much shorter, half or more sheathing with a short, subulate blade or sometimes reduced to an acuminate sheath. *Spike* second, lax, 1–20-flowered. *Bract* narrow-oblong, obtuse or subacute, 3–5 cm long; bracteole as long as bract or slightly shorter, obtuse or minutely bidentate. *Flowers* largish, tubular-campanulate, very fragrant at night, in pale shades, varying from white or cream to buff, or pale yellow usually tinged with greens with a greenish yellow zone in lower half of lower lobes, usually more or less flushed or finely stippled with mauve, pink, dull red, brown or purplish brown outside and with a median stripe of the same colour on inside of 3 upper lobes; the area between the fused lower part of lobes transparent. *Perianth tube* 4–6 cm long, extending 1–2 cm above bract, curved shortly above middle, slender below and more or less funnel-shaped above, usually 1–1,5 cm diam. at throat; *lobes* patent, tapering to fairly short acute or occasionally acuminate tips, 2–3,3 cm long, the dorsal ovate or ovate-elliptic, 1,5–2,3 cm wide, other 5 subequal or lowest sometimes slightly narrower than laterals, ovate-elliptic, elliptic, or occasionally ovate-lanceolate, 0,8–1,5 cm wide, the 3 lower connate for 5–7 mm at base. *Stamens* subarcuate, arising 1,7–2,5 cm below top of tube, the filaments not exerted, 1,6–2,2 cm long; anthers linear, subsagittate, 1,2–1,6 cm long. *Ovary* narrow-oblong or subturbinat, 0,8–1,2 cm long; style reaching shortly below top of anthers, with obcordate-spathulate branches 4–6 mm long. *Capsule* obtusely spindle-shaped up to 4 cm long and 1,2 cm broad, chartaceous, green; *seed* c. 5 mm in diam. with a wide wing.

Common in the winter-rainfall region of the Cape, from Clanwilliam to Humansdorp, fairly frequent locally in sandy humus in marshy ground near vleis or streams on flats and mountain slopes up to 1 800 m altitude, flowering from August to October but sometimes also in November to January.

Three varieties are recognized.

KEY TO VARIETIES

Spike with 1–8 flowers, flowering August to November:

Flowers more or less tubular campanulate, densely striped and stippled with dark green or various dark-hued shades on a pale cream or yellow background (a) var. *tristis*

Flowers usually more funnel-shaped and concolorous, pale sulphur yellow or cream (b) var. *concolor*

Spike up to 20-flowered, usually 8–10, flowering December to January (c) var. *aestivalis*

(a) var. *tristis*

G. tristis L., Sp. Pl. ed. 2 : 53 (1762); Burm. f., Prodr. 2 (1768) excl. ref. Breyn. Prodr.; Hoult., Nat. Hist. II, 12 : 47 (1780); Thunb., Diss. Glad. n. 8 (1784) pro parte, Prodr. 8 (1794), Fl. Cap. 1 : 176 (1811), ed. Schult. 42 (1823), pro parte; Lam., Encyc. 2 : 724 (1786); Ait., Hort. Kew. 1 : 63 (1789); Curtis's bot. Mag. t.272 (1794); Willd., Sp. Pl. 1 : 210 (1798) excl. ref. Breyn., Prodr. et *G. tristis* var. Jacq., Ic. t.244, Coll. 4 : 158; Red., Lil. t.35 (1802); Pers., Syn. 1 : 43 (1805); Vahl, Enum. 2 : 84 (1806) excl. ref. Breyn. Prodr.;

Spreng., Syst. **1** : 151 (1825); Ker, Irid. Gen. 136 (1827); Loudon, Ladies Fl. Gard. t.12 (1841); Klatt in Linnaea **32** : 715 (1863); Bak. in J. Linn. Soc. **16** : 172 (1877), Handk. Irid. 203 (1892), Fl. Cap. **6** : 139 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 225 (1893); Gard. Chron. Ser. 3. **45** : 148, 149 (1919) fig.; Pole Evans, Flower. Pl. S. Afr. **5** : t.175 (1925); L. Bolus, Barclay & Steer, First Book S. Afr. Flrs t.138 (1928); Ingram in Gard. Chron. Ser. 3. **88** : 300 (1930); Lewis in Adamson & Salter, Fl. Cape Penins. 262 (1950). *G. tristis* var. Jacq., Ic. t.245 (1795), Coll. Suppl. 20 (1797). Sine nom. Miller, Ic. 157, t.235 f.1 (1758). Type: (LINN 59.9 holo., PRE, photo.). *G. versicolor* var. *longifolius* Ker in Curtis's bot. Mag. sub t.556 (1802). Type: no type preserved. *G. spiralis* Pers., Syn. **1** : 43 (1805). Type: Jacq., Ic. t.245. *G. flavidus* Ingram in Gard. Chron. ser. 3, **88** : 301 (1930). No type preserved. *G. fulvescens* Ingram, l.c. No type preserved. Pre-Linnaean. Trew, Pl. Sel. (Ehret) t.39 (1750) under the phrase name *Lilio-Gladiolus bifolius biflorus folius quadrangulus*.

In the Linnaean Herbarium there are two sheets of the species, one with a single flower 59.7, labelled H.U. (viz. grown in his garden), and 59.9 bearing four flowers, named *G. tristis major*. In the description Linnaeus describes the species as two- to many-flowered; therefore, despite the word *major*, this sheet is selected as the type. Two other sheets placed under *tristis*, are not this species but *G. liliaceus* Houtt. (59.8; a Sparrman collection) and *G. gracilis* Jacq. (59.10). Linnaeus cites Ehret's t.39 in Trew, *Plantae Select.*; this plant has more or less white flowers marked with rosy-red and is one of the most attractive forms of this widespread and variable species.

According to Collingwood Ingram's article on *G. tristis* in the *Gardener's Chronicle* of 1930, the plate is a very fair representation of a plant he discovered in the Bokkeveld, near Ceres, and this form appears to be confined to that area extending up to the eastern border of the Clanwilliam district.

In the same paper Ingram upheld *G. concolor* Salisb. as a separate species and described three new ones. Two of them, *G. flavidus* and *G. fulvescens*, are known only from the descriptions and sketches of the flowers as no type specimens were preserved. However, plants from the same areas which agreed with Ingram's descriptions were examined by Lewis, who considered them to be forms of *G. tristis*, so these two names are included in the synonymy, under the type variety.

G. concolor, following Baker and others, is maintained as a variety of *G. tristis*. Although there is little difficulty in recognizing the plants in the living state they are not so easily distinguished when dried and some of the specimens cited above under *G. tristis* might belong to this variety. *G. aestivalis*, the third new species described by Ingram, is reduced to a variety, distinguished by the characters mentioned below.

Thunberg listed a large number of varieties under *G. tristis* in his *Dissertatio de Gladiolo* of 1784 but in his later works on the flora of South Africa he assigned

nearly all of them to other species. In spite of eliminating so many, his concept of *G. tristis* remained very broad and embraced two other distinct species, the five sheets named *G. tristis* in his herbarium containing three different species, as follows:

1079. A poor specimen of *G. tristis* with a solitary flower which is smaller than normal. N. E. Brown remarked that he did not match it at Kew (*J. Linn. Soc.* **48** : 32 (1928)).

1080. *G. maculatus* Sweet.

1081–3. *G. hyalinus* Jacq. (syn. *G. confusus* N.E. Br.).

A pre-Linnaean figure in Breynius's *Prodromus*, t.7 f.1 (1739), cited under *G. tristis* by Burman f. and two or three other authors, is not this species but *G. maculatus* Sweet. No. 921 in Willdenow's herbarium in the Berlin-Dahlem Herbarium, named *G. tristis*, is probably a horticultural hybrid. The flower-spike looks very like *G. tristis* but the leaves are soft, flat and grass-like. A second specimen under the same number was correctly identified as *Sparaxis bulbifera* by Klatt.

G. tristis was one of the first species to be cultivated in England where it is recorded as flowering in the Chelsea Botanic Garden in 1745, and was used for raising some of the early small-flowered hybrids such as *G. x colvillei*, a cross with *G. cardinalis*, which is still popular today. Although the colour of the flowers is not very striking it is generally agreed that they are by no means as gloomy or dismal as Linnaeus considered them to be, in fact some of the forms with pale semitranslucent flowers have a distinct charm of their own. They are also very sweetly scented at night, and in spite of their somewhat delicate appearance the plants are remarkably hardy and can be grown in sheltered places out of doors in the south of England, and are easy to increase from seeds or cormels. For these reasons the species has remained a favourite of horticulturists for more than two hundred years, and in recent years has been used by Dr T. T. Barnard for raising some of his very attractive scented hybrids.

COLOUR PLATE 16. STELLA GOWER. *Flower. Pl. Afr.* t.175 (1925).— Inflorescence and top of basal leaf; 1, plant much reduced; 2, corm with cormlets; 3, longitudinal section of flower; 4, portion of leaf; 5, cross-section of leaf \times ; 6, stamen; 7, top of style with stigmatic branches; 8, ovary.

Ex hort. Pole Evans, Irene, Pretoria. September 1924.

CAPE.—Bellville: Tygerberg, *Pappe* (SAM 21323). Bredasdorp: The Poort, near Bredasdorp, *Acocks* 1520 (S); Uilenkraals River mouth, *Linley* (SAM 59748). Caledon: Swartberg, *Ecklon & Zeyher* 166, partly, (LD); Swartberg, near Spring, *Templeman*, herb. MacOwan 2607 (BM, K, P, SAM); Caledon, *Zeyher* (K); between Babylon's Tower and Caledon, *Ecklon & Zeyher* 164 (LD, S), s.n. (C, L, P, PRE, UPS, Z); Kleinhouhoek, *Zeyher* (SAM); Hemel en Aarde, *Barnard* (BOL); Genadendal, *Roser* (PRE); 8 km N.W. of Riviersonderend, *Heginbotham* 76 (NBG). Cape Peninsula: Lion's Head and near Green Point, *Drège* (S); near Cape Town, *Ecklon & Zeyher* (S); Rondebosch and between Constantia and Steenberg, *Drège* (K, S); near Constantia, *Ecklon* 319 (G, K, P, PRE, S, Z); Orange Kloof, *Guthrie* 1274 (BOL); Kirstenbosch, *Barnard* (BOL). Ceres: Valsch Gat Kloof, *Esterhuysen* 1578 (BOL); between Rooдеberg and Matroosberg, *Stokoe* (SAM 55634). Clanwilliam: Brakfontein, Olifants River valley, *Zeyher* 165 (SAM); Cedarberg, Uitkyk Pass, *Acocks* 2209 (S), *Leighton*, Bol. Herb. 21502 (BOL, PRE, SAM); Krakadouw, *Leipoldt* 779 (SAM); Boontjieskloof, *Esterhuysen* 12209 (BOL); N. of Langberg, *Taylor* 1844 (NBG). George: Malgat River, *Burchell* 6116 (K); between George and Malgat River,

Burchell 6087 (K); top of Outeniqua Pass, *Lewis* 3637 (SAM). Humansdorp: Assegaibos, *Britten* (GRA). Knysna: between Knysna and George, *Gillett* 4540 (BOL); Grooterivier, *Fourcade* 1469 (G, BOL, GRA, K), *Humbert* 10036 (P); Sedgfield, *Middlemost* 2125 (NBG); Plettenberg Bay, *Rogers* 26686 (Z); Witteklip, near Knysna, *Lindeberg* (S). Ladismith: Seven Weeks Poort, *Andreae* 1171 (PRE), *Bayliss* 2440 (NBG), *Loubser* 2064 (NBG); Toorkop, *Wurts* 1153 (NBG). Mossel Bay: Mossel Bay, *Marloth* 7474 (PRE). Prince Albert: N. end of Seven Weeks Poort, *Lewis* 6171 (NBG); Swartberg Pass, *Bolus* 12348 (BOL, GRA, PRE, BR), *Stokoe* (SAM 49469, 55753). Riversdale: Albertinia, *Muir* 595 (SAM), herb. Galpin 5473 (PRE); Soetmelks River, *Acocks* 2136 (PRE); Garcia's Pass, *Phillips* 404 (K, SAM); Muiskraal, near Garcia's Pass, *Galpin* 4702 (PRE). Somerset West: Helderberg, *Salter* 4242 (BM), *Galpin* 12380 (PRE). Stellenbosch: Kanonberg, Bottelary road, *Acocks* 4033 (S). Swellendam: Rivier-sonderend, near Appelskraal, *Zeijher* 1630 (BOL, G, P, PRE, S, SAM, Z); near Stormsvlei, Hassaquaakloof and Breede River, *Zeijher* 1630 (S); Tradouw Pass, *Sidey* 1797 (S). Worcester: Waaihoek Peak, *Esterhuysen* 22600 (BOL, K), *Wasserfall* 824 (NBG); Dutoitskloof, *Drege* (P, S), *Marloth* B. 19 (PRE), *Linley* (SAM 59750), *Tyson* 886 (SAM).

WITHOUT LOCALITY: herb. Burman (G); herb De Candolle (G); *Drège* (G, L); *Ekeberg* (S); herb. Jussieu 3641 (P); herb. Lamarck (P); herb. Lalande (P); *Kolbing* (LE); *Prior* (K); *Retzius* (LD); *Sparman* (S, UPS); *Thunberg* (BM, S, UPS—herb. Thunb. sheet 1079); *Thom* 951 (K); *Ventenat* (G); *Verreaux* (G).

There are two records from widely separated localities in the eastern Cape Province which cannot be accepted as evidence that the species occurs there without further proof. One, in the Compton Herbarium, is from Hogsback in the Stockenström district (*Barker* 2036), and the other, in the Bolus Herbarium, is from Graaff-Reinet (*Sister Francis* 40). It is suspected that these might be escapes from cultivation.

(*b*) var. **concolor** (Salisb.) Baker in J. Linn. Soc. **16** : 172 (1877), Handbk. Irid. 203 (1892), Fl. Cap. **6** : 139 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 225 (1893); Gard. Chron. ser. 3, **38** : 187; fig. (1905); Marloth, Fl. S. Afr. 4, t. 46 D (1915). Type: Salisb., Parad. Lond. t. 8 (lecto.). *G. concolor* Salisb., Parad. t. 8 (1805); Ingram in Gard. Chron. ser. 3, **88** : 301 (1930). Type: as above. *G. tristis* Jacq., Coll. **4** : 157 (1792), Ic. 2 t. 243 (1795). *G. tristis* var. Ker in Curtis's bot. Mag. t. 1098 (1808).

Common names: Aandblom; Vlei-aandblom; Geel-aandblom; Wit Afrikaner; Trompetters.

Flowers 1–8, usually concolorous, pale sulphur-yellow or cream, sometimes greenish in throat and with greenish median stripes on lobes or occasionally a purplish streak on the upper, more funnel-shaped than var. *tristis* with the tube curved near middle, subcylindrical above, and lobes less spreading, usually slightly longer and more acute.

Same habitat as var. *tristis* but less frequent, flowering September to October.

CAPE.—Bredasdorp: The Poort, near Bredasdorp, *Barker* 2488 (NBG); Potteberg, *Esterhuysen* 23279 (BOL). Caledon: Swartberg, near Caledon, *MacOwan* HAA 808 (BM, BOL, G, GRA, K, P, SAM, UPS); near Caledon, *Barker* 27 (K), *Marloth* 7094 (PRE); E. side of Bot River valley, near Hawston, *Wilman* 803 (BOL). Mossel Bay: Ruitersbos, *Hops* (BOL); Robinson Pass, *Hops* (BOL). Swellendam: Bonnievale, *Compton* 3371 (BOL). Without locality: *Gronovius* (BM).

(*c*) var. **aestivalis** (Ingram) Lewis stat. nov. *G. aestivalis* Ingram in Gard. Chron. Ser. 3, **88** : 301 (1930). Type: Cape, *Ingram* (BM).

Common name: 'Summer Marsh Afrikaner.'

Plant taller and more robust, *corm* up to 3 cm diam. and stem up to 1,5 m high, usually 1–1,2 m. *Leaves* usually 4. *Spike* more crowded than var. *tristis*, up to 20-flowered, usually 7–10. *Flowers* more funnel-shaped than var. *tristis*, with less spreading lobes, cream, pale yellow or sulphur-yellow marked with brown or purple outside, the throat and lower half of lower lobes greenish yellow inside and 3 upper with a reddish brown to dark blackish purple double median stripe.

Same habitat as var. *tristis* but flowering period later, December to January.

CAPE.—Bellville: Tygerberg, *Pappe* (BM). Caledon: Betty's Bay, *Topper* (NBG). Cape Peninsula: between Table Mt. and Devil's Peak, *Goulimis* (BOL); near Constantia, *Ecklon* 319 (K); between Constantia and Wynberg, *Drège* (P); near Rondebosch, *Drège* (K). Ceres: Witsenberg, *Pappe* (SAM 21476), *Žeyher* 1630 (SAM), *Jackson* (NBG). Paarl: Paarlberg, *Bolus* 5569 (BOL, K); French Hoek Mts, *Marloth* 8135 (PRE); Drakenstein Mts, hort. *Ingram* (BM, K). Somerset West: Helderberg, *Galpin* 12380 (K). Stellenbosch: Pniel, *Starke* (BOL); Jonkershoek valley, *Esterhuysen* 9702 (BOL). Tulbagh: Great Winterhoek, *Marloth* 490 b (PRE). Without locality: *Masson* (BM); *Niven* (K); *Roxburgh* (BM); *Thom* (K).

64. **Gladiolus liliaceus** Houtt., Nat. Hist. II, **12** : 55 t.79 f.2 (1780); Panzer, Pflanzensyst. **11** : 65, t.79 f.2 (1784); Roem. & Schult., Syst. Veg. **1** : 445 (1817); Ker, Gen. Irid. 147 (1827); Lewis in Bot. Notiser **119** : 228 (1966). Type: *Houttuyn* in herb. Burman (G, holo., NBG, PRE, photo.).

G. tristis L. var. *grandis* Thunb., Diss. Gladiolus 8c (1784). *G. grandis* Thunb., Prodr. 185 (1800). Fl. Cap. **1** : 186 (1811), ed. Schult. 45 (1823); Vahl, Enum. **2** : 87 (1806); Roem. & Schult., Syst. Veg. **1** : 414 (1817); Eckl., Top. Verz. 39 (1827); Klatt in Linnaea **32** : 714 (1863); Bak. in J. Linn. Soc. **16** : 172 (1877), Handbk. Irid. 202 (1892), Fl. Cap. **6** : 138 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 217–18 (1893) excl. syn. *G. affinis*; Marloth, Fl. S. Afr. **4**, t.48a (1915); Hamer, Wild Flrs of Cape t.17 (1926); N.E. Br. in J. Linn. Soc. **48** : 22 (1928); Ingram in Gard. Chron. ser. 3, **88** : 258–9, 345 (1930); L. Bol., Barclay & Steer, Second Bk. S. Afr. Flrs t.172 (1936); Lewis in Adams. & Salter, Fl. Cape Penins. 262 (1950); Rice & Compton, Wild Flrs Cape Good Hope t.205 f.2 (1951). Type: Cape, Thunberg (UPS 1031, holo.).—var. *lucidus* Ingram in Gard. Chron. ser. 3, **88** : 345 f.134 (1930). No type preserved. *G. versicolor* Andr., Bot. Rep. t.19 (1798); Ait., Hort. Kew. ed. 2, **1** : 98 (1810); Roem. & Schult., Syst. Veg. **1** : 412; Spreng., Syst. Veg. **1** : 152 (1825) excl. ref. *G. venosus*; Ker, Gen. Irid. 135; Reichb., Fl. Exot. **1** : t.34 (1834). Type: Bot. Rep. t.19—var. *major* in Curtis's bot. Mag. sub t.556 (1802) et t.1042a (1807). Type var.: Curtis's bot. Mag. t.1042a. (See fig. 36.)

Common names: Large Brown Afrikaner, Aandypie.

Corm subglobose, 1–2,5 cm diam., with hard dark or reddish brown tunics slit up from the base into regular cuspidate teeth. *Stem* simple, slender or moderately slender, more or less flexuose, 25–90 cm high, average 40–60, with 2 (rarely 3) sheaths at the base, the outer obtuse, submembranous, brown or yellowish, 2–8 cm long, the inner usually 3,5–8 cm long, green, faintly striate and minutely hispidulous, sometimes brown or purplish, occasionally up to



FIG. 36. *G. liliaceus* Houtt. (*G. versicolor* Andr.) *Bot. Rep.* t.19 (1798).

20 cm long with a short lanceolate or subterete blade. *Leaves* 3 (rarely 2 or 4), the lowest usually slightly longer than stem, with a short striate sheath and long slender blade, subterete and sulcate or linear, up to 3 mm wide, with very prominent margins and midrib; second similar but the sheath much longer and blade shorter; uppermost 7–22 cm long, usually about half sheathing with a subulate or acicular blade. *Spike* secund, laxly 1–3-flowered or occasionally up to 5. *Bract* lanceolate or oblong-lanceolate, acuminate or tapering to a short or long cusp, 5.5–10 cm long (rarely up to 15 cm); bracteole lanceolate, oblong-lanceolate or linear-oblong, 4–7.5 cm long, usually very shortly bifid or bidentate. *Flowers* large, very fragrant at night, variable in colour, usually yellowish or pale dull yellow densely flecked with pale to dull brown or pinkish brown, pinkish red or purplish streaks, often with a deeper medial stripe on upper lobes, the lower half of the lower not streaked and of the dorsal partly translucent, sometimes greenish cream with or without red in the throat; the colour changing in the dark to a dark mauve or blue. *Perianth tube* curved, 3.8–6 cm long, the upper $\frac{1}{3}$ or $\frac{1}{2}$ funnel-shaped, often shortly puberulous inside; lobes subequal or the dorsal slightly larger than other 5, more or less patent with undulate tapering recurved tips, acute, obtuse or emarginate, sometimes the 3 inner slightly shorter and less tapered than 3 outer, varying from lanceolate or ovate-lanceolate, tapering a little to the base, to more or less elliptic, 3.5–5.5 cm long, 0.9–1.6 cm wide or the dorsal sometimes up to 2 cm, the 3 lower connate for 0.5–1 cm at the base. *Stamens* subarcuate, arising 1.3–1.6 cm below top of tube often shortly puberulous below; filaments 1.5–2 cm long, reaching top of tube or shortly exerted; anthers linear, 1–1.7 cm long, reaching below middle of dorsal lobe. *Ovary* linear-oblong, 0.8–1 cm long; style often shortly puberulous below reaching top of anthers or shortly above, the branches usually 3–4 mm long, broadly spatulate or with suborbicular stigmas. *Capsule* ellipsoid, 2.5–3.3 cm long, pale, thin-walled; seeds broadly winged, yellow-brown, somewhat irregularly oblong or rhomboidal, 5–6 mm long.

Widespread from Clanwilliam to Port Elizabeth in the Cape, seldom very common in any area, in sandy soil on flats, hills and mountain slopes up to 1 800 m altitude, flowering from August to December.

CAPE.—Bredasdorp: near Strandkloof, *Thomas* (NBG); Elim hills, *Compton* 9126 (NBG); Elim, *Walters* (NBG); Dirkie Uys Kraal, *Van Breda* 923 (PRE); near Baardskeedersbos on Elim road, *Richmond* 18 (NBG); The Poort, *Van Niekerk* 318 (NBG); near Ratel River, *Van Niekerk* (NBG); between Elim and Struis Bay, *Barker* 149 (BOL, K); Cape Agulhas, *Ecklon* (S). Caledon: between Somerset, Sneekup and Dwarsberg, *Stokoe*, SAM 49474 (PRE, SAM, UPS); Swartberg, Caledon, *Ecklon* & *Zeyher* 166 (G, LD—partly), s.n. (BR, C, L, LD, PRE, Z); between Viljoen's Pass and French Hoek Pass, *Stokoe* (SAM 60213); Palmiet River valley near Grabouw, *Bolus* 4023 (K), *Botha* (NBG); Caledon, *Zeyher* (K), *Marloth* 7095 (PRE); 10 km E. of Caledon, *Theron* 2020 (K, PRE); Shaw's Pass, *Martin* 1162 (NBG), *Van Niekerk* 664 (BOL, K); 14 km S.E. of Oudekraal, *Salter* 4802 (BM, K). Cape Peninsula: Hout Bay, *Prior* (K); Lion's Head, *Pappe* (BM); Cape Town, *Prior* (K); Table Mt., *Ecklon* 320 (G, K, ONF, P, PRE, S, Z), s.n. (C, S); eastern slopes of Table Mt., *Pillans* (BOL 14802); above Groote Schuur, *Dod* 511 (BM, K); Table Mt. above Wynberg, *Pappe* (SAM 21276); near Claremont, *MacOuan* HNAA 809 (BM, G, K, P, SAM, UPS); near Wynberg, *Tyson* 2484 (GRA, SAM); Wynberg Hill, *Salter* 9267 (BM); Constantia, *Parks* (NBG), *Salter* (SAM 53036); Vlaggenberg, *Schlechter* 452 (G, P, Z); Tokai, *Bolus* s.n. (BOL); Steenberg Plateau, *Krauss* (G), *Thomas* (NBG); Silvermine valley, *Lewis* 958 (SAM); Muizenberg Mt., *Bolus* s.n. (BOL); Miller's Point, *Salter* 334/7 (BM); Cape of Good Hope, *Schinz* (Z); Cape Flats, *Moyle Rogers* (BM). Ceres: Witsenberg, *Zeyher* 3978 (K, SAM); Agter Witsen-

berg valley, *Barnard* (NBG); Skurfsdeberg Pass, *Compton* 16806 (NBG), *Lewis* 857 (SAM); Bokkerivier Farms, between Hex River Mts and Roodeberg, *Middlemost* 2242 (NBG); Rosendallontein Farm, *Pillans* 9721 (BOL), *Marloth* 7685 (PRE). Clanwilliam: Clanwilliam, *Mader* 2162 (K, SAM); Cedarberg, Middelberg, *Taylor* 1624 (SAM), *Esterhuysen* 7296 (BOL); Krom River Kloof, S. Cedarberg, *Esterhuysen* 17979 (BOL). George: George, *Penther* 696 (Z), *Rust* (NBG), *Burchell* 6056 (K, L, P); forest near George, *Burchell* 5824 (K, P); Montagu Pass, *Hutchinson* 1176 (K), *Rehmann* 48 (Z); Swart River Heights, *Fourcade* 4792 (BOL). Hopefield: Leliefontein, near Hopefield, *Bachmann* 1120 (Z). Humansdorp: Humansdorp, *Christie* (K); Kruisfontein Mts, *Galpin* 4716 (GRA, PRE); W. of Humansdorp, *Lewis* 6159 (NBG), *Theron* 1834 (K, PRE); Witte Els Bos Laagte, *Leighton* 3064 (BOL); Loerie Plantation, *Dix* 64 (GRA, BOL); Oubos Flats, *Fourcade* 1940 (BOL, K); E. of Kromme River mouth, *Fourcade* 2783 (BOL, K). Knysna: Lottering Flats, *Taylor* 635 (NBG); Plettenberg Bay, *Smart*, herb. Rogers 15519 (PRE); Keurbooms River valley, *Humbert* 10074 (P). Mossel Bay: between Mossel Bay and Gouritz River, *Lewis* 3635 (SAM); 14 km W. of Mossel Bay, *Barker* 8211 (NBG); Cloete's Pass, *Stayner* (NBG). Oudtshoorn—Prince Albert: Swartberg Pass, *Bolus* 11648 (BOL), *Stokoe* (SAM 55752, 68332). Paarl: French Hoek, *Schlechter* 9330 (GRA, PRE, Z), *Marloth* 5617 (PRE); French Hoek Pass, *Barker* 4148 (NBG); between Paarl and French Hoek, *Drège* 8431a (G, K, P, S). Piketberg: Zebra Kop, *Pillans* 7271 (BOL). Port Elizabeth: Bethelsdorp, *Fries*, *Nordlindh* & *Weinmarck* 649 (K, LD, PRE, S, SAM), *Paterson* 813 (BOL); Port Elizabeth, *Dyer* 616 (GRA, L), *Bokelmann* (NBG), *E. S. C. A. Herb.* 54 (L, Z); Baakens River, *Fries*, *Nordlindh* & *Weinmarck* 283 (LD, S); between Swartkop and Van Stadens Rivers, *Ecklon* 687 (S); foot of Van Stadens Mts, *Holland* (LD, S), *Hutchinson* 1489 (BOL, K), *Drège* (K), 8431b (BM, CGE, ONF, P, S); Kraggakama, *Holland* 3755 (BOL); Walmer, *Paterson* 3361 (K, PRE); Algoa Bay, *Forbes* (CGE). Riversdale: foot of Langeberg, *Muir* 763 (SAM); Garcia's Pass, *Bolus* 11384 (BOL), *Thorne* (SAM A41602), *Van Breda* 1474 (PRE); near Soetmelks River, *Burchell* 6723 (K). Swellendam: Below 10 o'clock Mt., *Wurts* 339, 397 (NBG); near Riviersonderend, *Zeyher* 3978 (G, K, P, PRE, S, Z), *Gill* (K); Puspasvlei, Voormansbos—Keurbooms R., *Ecklon* & *Zeyher* 165 (G, LD, S). Tulbagh: Tulbagh, *Pappe* (BM, SAM); Sneeuwgat valley, Great Winterhoek, *Phillips* 1867 (SAM); Winterhoek, *Pappe* (K); Kleinpoort, near Tulbagh, *Marloth* 490 (PRE). Uitenhage: Loerivier, *Penther* 557 (S, Z), 690 (Z); Silwerivier, *Penther* 695 (Z); 24 km up Elands River road, *Acocks* 21272 (PRE). Uniondale: Prince Alfred Pass, *Acocks* 19956 (PRE), *Middlemost* 2187 (NBG); Mannetjieberg *Esterhuysen* 6470 (BOL, K, PRE); Die Hoek, N. foot of Tsitsikamma Mt., near Joubertina, *Esterhuysen* 16351 (BOL). Worcester: Dutoitskloof, *Drège* (K), *Esterhuysen* 22297 (BOL); without precise locality, *Cooper* 1630 (BM, K), 1688 (BM, K, Z), 3191 (K).

WITHOUT LOCALITY: *Brehm* (M); herb. Linnaeus (LINN, sheet 59.8); herb. Burman (G); herb. Houttuyn (G, herb. Burman); *Thunberg* (BM, G, S, UPS—sheet 1031 in herb. Thunberg, type of *G. grandis*); *Harvey* 900 (BM, K), 905 (K); *Mund* & *Maire* 171 (UPS); *Roxburgh* (G); *Sieber* 36 (P), s.n. (G); *Drège* (L); *Lalande* (P); *Lehmann* (P); *Sonnerat* (P); *Kolbing* 24 (G); *Verreaux* (G, K).

It is unfortunate that this species, so aptly named *G. grandis* by Thunberg in 1800 and so well known since then by that name, must revert to the older and little-known name given to it twenty years earlier by Houttuyn. However, even if Houttuyn's name was not legitimate, there is the name *G. versicolor* published by Andrews in 1798, with an excellent illustration of the plant, so that Thunberg's is in fact the third to be given to this species and cannot be retained.

G. liliaceus was figured and described by Houttuyn, who noted that as it did not seem to belong to any of the named species, he named it *G. liliaceus*, because he considered that the flower looked very much like a lily, although it had the characteristics of *Gladiolus*, i.e. one of the lobes being shorter and broader than the others. His description, combined with the rather poor illustration, leaves no doubt as to the identity of the plant, but in addition there is a specimen of Houttuyn's named *G. liliaceus* in Burman's collection in the Delessert Herbarium in Geneva which agrees with the plant figured and is presumed to be the type. (Fig. 37.)

In spite of this the identity of *G. liliaceus* appears to have remained obscure since the name was first published. It was placed with a query as a synonym of *G. angustus* L. by Thunberg, and as synonym of *G. gracilis* Jacq. by Roemer & Schultes (*Systema Vegetabilium* 3: 392. 1817). Ker placed it among the incertae

PLAAT LXXIX.



FIG. 37. *G. liliaceus* Houtt. from Houttuyn, *Nat. Hist.* II, 12, t.79 f.2.

in his *Iridearum Genera* and Baker omitted the name altogether from his works on *Gladiolus*. Merrill, in a paper on Houttuyn's New Genera and New Species published in 1938 (*Journal of Arnold Arboretum*, v. 19, p. 326), referred to the species as follows: '*G. liliaceus* Houtt. Nat. Hist. . . . The entry in *Index Kewensis* is "*liliaceus* Houtt. Handleid. 12: 55 = *angustus*, *gracilis*". Houttuyn's figure does not conform to the published illustrations of either *G. angustus* L. or *G. gracilis* Jacq. Manifestly only a single species is represented, not a mixture of two separate ones. It is not accounted for by Baker in his treatment of the Iridaceae of South Africa in the *Flora Capensis*, 6. Whilst it clearly belongs in the group with terete or slender leaves, I am not able, from my limited knowledge of the genus, to refer it definitely to any of the generally recognized species. Houttuyn's material was from the Cape of Good Hope.'

Houttuyn described the flowers as yellow, which perhaps is a little misleading as a pure yellow flower is rare in this species. The yellow or dull ochre-yellow ground is almost always very densely covered with fine streaks, at least on part of the lobes, of either pale or dull brown, pinkish brown, pinkish red or purplish red, often with a deeper medial stripe on the upper lobes. Occasionally, however, it is partly streaked with a very pale brown or tawny colour so that the general effect is more yellow than brown. From the Knysna district eastwards the flowers are usually greenish cream in colour, often reddish in the throat and sometimes the lobes densely and closely speckled with red. The form from Port Elizabeth was described as *G. grandis* var. *lucidus* by Ingram in 1930.

Not only is the colouring variable by daylight but towards the evening it undergoes a complete change, to a mauve or blue-mauve shade, when the flowers, which have little or no scent during the day, become extremely fragrant. In 1798 Andrews referred to this phenomenon as follows: 'The *G. versicolor* might, like the camelion [*sic*], equally be a subject of contention, to those who have seen its blossom at different periods of the same day; for, strange to tell, it is brown in the morning, and continues to change from that colour till it becomes light blue by night. During the night it regains its pristine colour, and this change is effected diurnally, whilst the flower is in its vigour.' In an article on *G. grandis* in the *Gardener's Chronicle*, Collingwood Ingram pointed out that Andrews is mistaken here and that the diurnal colour is not regained until the early morning.

On plate 1042 of *Curtis's Botanical Magazine* Ker figured two specimens as varieties of *G. versicolor* (the same plate was reproduced in Reichenbach's *Flora Exotica* in 1834). The single flower of the one he named var. *major* is the reddish colour form of *G. liliaceus*, but the larger and principal plant, figured as var. *binervis*, is almost certainly a hybrid, probably *G. tristis* x *carinatus*. Ker remarked that it was a variety he had never met before, very near *G. tristis* except that it did not have a quadrangular leaf, and that both varieties were very fragrant in the evening. Afterwards he changed his mind about this plant and in his *Iridearum Genera* of 1827 the name was reduced to a synonym of

G. laevis Thunb., i.e. the yellow colour form of *G. carinatus*, while Sweet, also in 1827, raised it to specific status as *G. binervis* in his *Hortus Britannicus* (p. 397).

G. liliaceus is closely allied to *G. tristis* L. and has often been confused with it, but is distinguished fairly readily by its much longer bract, usually tapering to a long pointed tip, and by its perianth lobes which usually taper to longer, more or less undulate recurved tips. In this respect Houttuyn's illustration is inaccurate. A specimen of *G. liliaceus* in the Linnaean Herbarium (sheet 59.8) is named *G. tristis* by the younger Linnaeus, and in many of the old collections it has been recorded under that name.

65. **Galdiolus hyalinus** Jacq., Ic. 2 : in consp. tab. 4 (1795); Coll. 4 : 170 (1792), Ic. t.242 (1795) sub nom. *G. strictus* Jacq. non Aiton (1789); Willd., Sp. Pl. 1 : 211 (1798); Vahl, Enum. 2 : 88 (1806); Poir. in Lam. Encyc. Suppl. 2 : 787 (1812); Spreng., Syst. Veg. 1 : 153 (1825); Ker, Gen. Irid. 137 (1827); Klatt in Linnaea 32 : 704 (1863); Baker, Handbk. Irid. 209 (1892), Fl. Cap. 6 : 148 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 218 (1893) excl. syn. *G. elongatus*; L. Bolus, Barclay & Steer, Second Book S. Afr. Flrs t.176 (1936). Type: Jacq. Ic. t.242. *G. tenellus* sensu Baker, Handbk. Irid. 204, Fl. Cap. 6 : 141; Marloth, Fl. S. Afr. 4 : t.48 B (1915); non Jacq. 1789. *G. confusus* N.E. Br. in J. Linn. Soc. 48 : 31 (1928); Lewis in Adamson & Salter, Fl. Cape Penins. 261 (1950); Kidd, Wild Flrs Cape Penins. t.59 f.9 (1950); Rice & Compton, Wild Flrs Cape of Good Hope t.205 f.3 (1951). Type: Cape, Devil's Peak, Bolus 4890 (K, holo., BOL).

Common name: Small Brown Afrikaner.

Corm ovoid, 1.5–2 cm diam., with coarse dark brown tunics cut up from the base into acuminate teeth, usually imbricate. *Stem* slender, simple, straight or flexuose, 15–60 cm high, average 25–45 cm, with 1–2 or occasionally 3 basal sheaths, the outer hyaline, obtuse or truncate, 2–6 cm long (rarely to 11 cm), inner up to 12 cm, obtuse or acute, greenish, grey, brown or purplish. *Leaves* 3, the lowest usually as long as the stem or slightly longer, occasionally only half as long, with lower $\frac{1}{4}$ – $\frac{1}{2}$ sheathing, faintly striate, sometimes minutely hispidulous, the blade subterete and sulcate or linear with prominent margins and midrib, 0.5–3 mm wide; second with a longer sheath and much shorter blade and uppermost 3–8 cm long or occasionally up to 12 cm, half or more sheathing. *Spike* 1–3-flowered, rarely up to 6, lax, secund. *Bract* lanceolate, oblong-lanceolate or narrow-oblong, acuminate to obtuse, 2.5–5.5 cm long, usually 3–4 cm, often with narrow hyaline margins; bracteole similar to bract but shorter and minutely bidentate. *Flowers* fairly small, recorded as scentless or fragrant towards evening, the colour variable, mostly yellow-brown, yellowish, cream or greenish brown variously streaked and spotted with dark brown, red-brown, maroon or purple, with a darker median stripe on the lobes, the lower half of the dorsal more or less pellucid and 3 lower pellucid along lower margins and conspicuously spotted along the midrib. *Perianth tube* 2.5–3 cm long, curved

above middle and upper third funnel-shaped; *lobes* unequal, the dorsal slightly hooded, porrect, ovate or broadly elliptic-ovate, acute or subacute, 2.4–2.8 cm long, 1.3–1.7 cm wide; upper laterals and lowest alike, more or less patent or projecting slightly forward, lanceolate or ovate-lanceolate, acuminate or acute, 2.2–3 cm long, sometimes distinctly longer than 3 inner, the 2 upper 7–9 mm wide and lowest 4–6 mm; 3 lower connate for 4–5 mm, the laterals reflexed and with a slight sideways twist, elliptic or ovate-elliptic, acute or subacute, 2.2–2.5 cm long, 0.7–1 cm wide. *Stamens* subarcuate, arising 7–9 mm below top of tube; filaments 1–1.4 cm long; anthers linear, subsagittate, 0.8–1.1 cm long. *Ovary* oblong or ellipsoid, 4–7 mm long; style reaching top of anthers, with broadly spatulate or obcordate-spatulate branches 2–3 mm long. *Capsule* ellipsoid, pale, subcoriaceous, 2.2–2.7 cm long; *seeds* broadly winged, pale brown, oblong-orbicular, about 7 mm long.

Occasional in the western Cape from Calvinia to the Peninsula and eastwards as far as Caledon, on hills and mountain slopes up to 1 300 m altitude, usually in clay or gravel soil, flowering from June to September, occasionally somewhat earlier or later.

CAPE.—Bellville: Bellville, *Rogers* 16361 (Z); Hercules Pillar, *Acocks* 4708 (S). Caledon: Villiersdorp, *Salter* 1146 (BOL). Calvinia: 8 km N.W. of Nieuwoudtville, *Hutchinson* 752 (K, NBG, PRE), Nieuwoudtville, *Lewis* 5751 (NBG); Glenridge Farm, near Nieuwoudtville, *Barker* 9566 (NBG), *Lewis* 6191 (NBG); near Tabaktuin, *Leipoldt* 789 (SAM); hills near Nieuwoudtville, *Leipoldt* 788 (K, BOL). Cape Peninsula: Hout Bay, *Schlechter* 1221 (GRA, Z); Hout Bay Nek, *Salter* 7421 (SAM); slopes above Camps Bay, *Glover* (BOL 15033), *Salter* 7459 (SAM), *Marloth* 5644 (PRE), *Ecklon* (S), *Barker* 3865 (NBG), *Cassidy* 286 (NBG); above Bakoven, *Barker* 3219 (NBG); Kloof Nek, *Lindeberg* (S); Lion's Head, *Prior* (K, PRE), *Pappe* (BM, BOL, K, SAM), *Dod* 512 (BM); near Cape Town, *Brehm* (BR); Signal Hill, *Rogers* 15589 (Z), *Dawson*, herb. Bol. 14749 (BOL, K, PRE, SAM); Table Mt., *Lindeberg* (S), *Gamble* 22085 (K), *Ecklon* (C, S), *Dummer* 7 (K), *Ecklon* & *Zeyher* 321 (K, OXF, P, S), *Tyson* 2489 (GRA, PRE, SAM); Devil's Peak, *Dod* 1314 (BOL, K), 3035 (BM, BOL, K), *Wilms* 3695 (AMD, BM, G, K, L, Z), *Krauss* (G), *Marloth* 7046 (PRE); Devil's Peak, near Mowbray, *Bolus* 4890 (BOL K—type of *G. confusus*). Ceres: Elandsloof Pass, Cold Bokkeveld (eastern side), *Thomas* (NBG), *Barnard* (NBG); N. of Wabooms River, *Barker* 8633 (NBG), *Lewis* 5012 (SAM); Ertjieslandkloof, *Barker* 3029 (NBG); Bokkeveld, *Marloth* 7563 (BOL, K, PRE); Witsenberg, *Esterhuysen* 23411 (BOL). Clanwilliam: Uitkyk Pass, *Stokoe* (SAM 55659); Pakhuis Pass, *Lewis* (BOL); Elandsloof, *Lewis* (BOL); Wupperthal, *Marloth* 7404 (PRE). Paarl: Witte River valley, *Esterhuysen* 12826 (BOL); Bain's Kloof, *Acocks* 4424 (S). Piketberg: Zebrakop, *Stokoe* 61325 (SAM), *Esterhuysen* 14493 (BOL). Stellenbosch: Botelary road, *Acocks* 2456 (S); Hasendal, Kuils River, *Rycroft* 2296 (NBG); Stellenbosch, *Sanderson* (K). Vanrhynsdorp: Gifberg, *Barker* 9570 (NBG). Worcester: Brandvleikop, *Bond* 365 (NBG); Audensberg, *Esterhuysen* 3179 (BOL, K); Sentinel Kloof, Hex River Mts, *Esterhuysen* 31202 (NBG); Matroosberg, A. *Bolus* in herb. Guthrie 4429 (BOL); Prospect Peak, Hex River Mts, *Esterhuysen* 15926 (BOL). WITHOUT LOCALITY: *Bergius* (L); herb. Burman (G); Oldenburg 251 (BM); *Pappe* (BM); *Prior* (BM); *Thunberg* (G, S, UPS, herb. Thunb. 1081, 1082, 1083); *Verreux* (G, K, P); *Villett* (K); herb. Willdenow 925 (B).

There has been the most extraordinary confusion about the name of this species, very largely due to its treatment by Baker in his *Handbook of Irideae* and the *Flora Capensis*. It was originally named *G. strictus* by Jacquin and was described and figured by him under that name in his *Collectanea* and the second volume of his *Icones Plantarum Rariorum*. Before the latter work was completed Jacquin found that the name had been given to another plant by Aiton in 1789 (= *Babiana stricta* (Ait.) Ker), so in the Conspectus of illustrations at the beginning of the volume changed the name of his plant to *G. hyalinus*.

Although Baker listed *G. hyalinus* in the *Flora Capensis* he stated that it was

known to him only from the description, and described and cited plants belonging to this species under *G. tenellus* Jacq., which is entirely different.

In a note under *G. tenellus* in his paper on the South African *Iridaceae* of Thunberg's Herbarium, N. E. Brown wrote as follows: 'The plant from Devils Peak and Table Mountain [*Bolus* 4890, etc.], placed by Baker and South African botanists under *G. tenellus* and sometimes also named *G. hyalinus*, is a totally different species from *G. tenellus* Jacq. This latter has a different corm, pale yellow flowers without dots, and with a dull purple line on the back of the obtuse segments, which are $2\frac{1}{2}$ – $3\frac{1}{2}$ lines broad. According to Bolus, the Devils Peak plant has flowers that are "greenish with a little purple", though the dried flowers appear to have been greenish yellow with a dark purple median line having several dots on each side of it at the basal part of the lower segments. The segments are acute and the dorsal one is 5–6 lines broad. For this plant I propose the name *G. confusus* N.E. Br.' (*J. Linn. Soc.* 48: 31. 1928). A detailed description follows and at the end he added: 'According to Bolus and Wolley-Dod in *Trans. S. Afr. phil. Soc.* xiv, 334, this plant has "dark brown flowers inclining to purplish, but, translucent and very rigid"; but, according to the coloured illustration of it in *Protected Wild Flowers of South Africa*, the ground-colour of the three upper segments is greenish yellow with a dark red mid-line and numerous lateral dark red streaks, the three lower segments greenish with darker green or purplish-green mid-line and streaks, the spots at the base of the segments not being represented, although they are very evident in dried specimens.'

As can be gathered from N. E. Brown's observations and the above description, the colouring of the flowers is very variable in this fairly widespread species. The length of the three outer lobes is also variable but the form which occurs on the Cape Peninsula, in which they are ovate-lanceolate and about as long as the three inner, is connected through intermediates with the other extreme in which they are lanceolate and distinctly longer than the inner. The lowest leaf is usually as long as the stem or overtops the flower-spike, and only occasionally about half as long as the stem, as in the plant figured by Jacquin. No doubt it was due to the short leaf in the type illustration that Baker and N. E. Brown failed to identify the plants they described with *G. hyalinus* Jacq.

A further complication was caused by Baker who confused the names *G. strictus* Jacq. and *G. striatus* Jacq. From Jacquin's illustration and description of *G. striatus* (*Ic.* t.260 and *Collect.* 5: 28), Baker described the same plant as both *G. strictus* Jacq. (*Handbk. Irid.* 205 and *Fl. Cap.* 6 : 142) and *G. striatus* Jacq. (*Handbk. Irid.* 209 and *Fl. Cap.* 6 : 148), stating under the first that the species was known to him only from the figure cited, and under the second that he knew it only from the description. This plant is not a *Gladiolus* but a *Babiana* and was transferred to that genus by Lewis several years ago (see list of species excluded from *Gladiolus* pp. 299–303).

66. **Gladiolus recurvus** L., Mant. 1 : 28 (1767); Lam., Encyc. 2 : 725 (1786); Willd., Sp. Pl. 1 : 208 (1798) excl. *G. recurvus* Thunb.; Vahl, Enum. 2 : 86 (1806); *G. ramosus* Burman f., Prodr. 2 (1768); non L. (1753). sine nom. Mill., Ic. 157, t.235 f.2 (1758). Type: Mill., Ic. t.235 f.2.

G. modestus Ingram in Gard. Chron. ser. 3, 90 : 9 (1931). Type: Cape, Breede River valley, Ingram; no type preserved, colour illustration (BM).

Watsonia recurva (L.) Pers., Syn. 1 : 43 (1805). Type: as for *G. recurvus*.

Corm ovoid or subglobose, 1,2–1,5 cm diam.; tunics hard, dark brown, slit up into narrow acuminate teeth, usually imbricate. *Stem* slender, simple, more or less flexuose, 30–50 cm high, with 2 basal sheaths, the outer obtuse or truncate hyaline, 2,5–5 cm long, inner up to 10 cm, obtuse, green or greyish. *Leaves* 4, seldom 3, the 2 lower with $\frac{3}{8}$ or more sheathing and firm subterete sulcate blades 5–12 cm long, about 1 mm diam., sometimes minutely scabridulous on edge of grooves; 2 upper similar but shorter and only $\frac{1}{2}$ or $\frac{1}{4}$ sheathing. *Spike* lax, secund, 1–3-flowered, occasionally 4. *Bract* lanceolate, acuminate or tapering to a long cuspidate tip, 3–5 cm long, green or dull brownish green with narrow hyaline margins; bracteole slightly shorter than bract, sometimes minutely bidentate. *Flowers* tubular with spreading lobes tapering to slender recurved tips, fragrant, varying from pale greenish grey or greyish mauve to pale yellow or cream, the lower lateral lobes usually paler, with fine purple streaks and dots on 3 lower extending down into throat, sometimes also as a single or double broken median line on upper. *Perianth tube* curved, 2,8–3,3 cm long, the upper half narrowly funnel-shaped; *lobes* with upper quarter more or less undulate, recurved and tapering to an obtuse tip, the dorsal obovate and somewhat concave below, 2,5–3 cm long, 1,3–1,6 cm wide; upper laterals and 3 lower subequal or 2 upper slightly larger than lower, patent, more or less oblong or obovate-oblong below the recurved tips, 2–2,6 cm long, 6–8 mm wide or 2 upper sometimes 1 cm, the 3 lower connate for 3–4 mm at base. *Stamens* suberect, arising 6–8 mm below top of tube and reaching about middle of dorsal lobe; filaments 1–1,3 cm long; anthers linear, subsagittate, 0,8–1 cm long. *Ovary* ellipsoid, 4–5 mm long; style reaching middle or top of anthers, with more or less conduplicate spatulate branches 2,5–6 mm long.

Occurs in the south-western Cape from Tulbagh and Ceres to Stellenbosch and Caledon; occasional on moist sandy flats or lower mountain slopes, flowering from June to early October.

CAPE.—Caledon: Caledon, Zeyher 470 (BOL). Ceres: Ceres, Rogers 28767 (Z); Witsenberg Vlake, Esterhuysen 23478 (BOL); without precise locality, Ceres Wild Flower Show, comm. L. Guthrie (BOL 20395), Lewis (BOL 20416), Barker 277 (NBG). Somerset West: Vergelegen, Johnson (NBG). Stellenbosch: Stellenbosch, Sanderson 952 (K); Muldersvlei, Burton (BOL). Tulbagh: Tulbagh, Pappe (K); without precise locality, Tulbagh Wild Flower Show, Bolus Herb. no. 14819 (BOL). Worcester: Botha's Halt, Van Breda 543, 1241 (PRE), 902 (NBG, PRE), Littlewood (NBG); Bain's Kloof, Loubser 968 (NBG).

WITHOUT LOCALITY: Burman (G); Thunberg (G); Wanman (S); Schlechter 583 (Z—locality 'Table Mt.' on label).

There is no specimen of this species in the Linnaean Herbarium and the lectotype must therefore be the plant figured in Miller's *Icones* in 1758, from

which it was described by Linnaeus. Ker under t.578 (which is *G. maculatus*) comments on the branched appearance of the Miller plant as follows: 'Miller's figure is, we believe, erroneous in representing it as branched, which we are almost certain it never is; very probably two close growing plants afforded that appearance to the draughtsman.' This explanation is most likely correct.

The plant described by Thunberg as *G. recurvus* is *Hesperantha (Ixia) radiata* (Jacq.) Ker and there is a specimen of this on sheet 59.12 in the Linnaean Herbarium, collected by Sparrman, with the name *G. recurvus* in his writing.

Shortly after Thunberg's misidentification, *G. recurvus* was confused with another species of *Gladiolus* and until a little over thirty years ago the common blue-mauve form of *G. carinatus* was known as *G. recurvus*, the mistake dating back to 1802 when it was figured by Ker under that name in *Curtis's Botanical Magazine*. Under *G. recurvus* in the *Flora Capensis* Baker included not only *G. carinatus* but also *G. maculatus* and specimens belonging to *G. longicollis*, all those from the Albany district eastwards cited by him belonging to the last. It is not surprising that not only South African botanists but others as well have experienced difficulty in identifying these species from the *Flora Capensis*.

In 1931 Collingwood Ingram described plants of *G. recurvus* from the Breede River valley, grown by him in England, as a new species which he named *G. modestus*. Apparently no type specimen was preserved but there is a colour illustration of Ingram's in the British Museum Herbarium. A sketch of the flower was published in the *Gardener's Chronicle* where it was described with another species, *G. hibernus* Ingram, but the titles under the figures of the flowers of the two species were inadvertently transposed and should be changed around.

G. recurvus is very closely allied to *G. maculatus* but distinguished by the colouring of the flowers and their narrower, more tapering and recurved lobes. As the colouring of the flower is nondescript it has never become a horticultural favourite, but to compensate for its dull appearance it has a delightful scent.

In the Zürich University Herbarium there is a sheet of *G. recurvus* collected by Schlechter, no. 583, recorded as coming from the top of Table Mt. and flowering in March, but there must have been some mistake about the label as this species does not occur on the Cape Peninsula and the usual flowering period is from June to the beginning of October. Although it is fairly widespread it is by no means common in any locality, as is evident from the small number of collections recorded.

67. **Gladiolus symonsii** Bol. f. in Ann. Bolus Herb. **2** : 99 (1917). Type: Natal, Underberg district, Bushmans Peak, *Symons* 336 (BOL, holo.).

Corm small ovoid, 1 cm in diam., covered with thin clawed fibrous tunics. *Stem* very slender, simple, 23–35 cm high, with a single hyaline basal sheath 3.5–5.5 cm long, obtuse or truncate. *Leaves* 3, the lowest 16–23 cm long, reaching middle of stem or nearly to base of spike, half sheathing, the blade

subterete or linear with very prominent margins and midrib, 1.5–2 mm wide; second with a longer sheath and shorter blade, and uppermost 2.5–7 cm long, half sheathing. *Spike* secund, somewhat laxly 2–4-flowered. *Bract* lanceolate or linear-oblong, acuminate or acute, 1.5–2.8 cm long, closely nerved and faintly striate; bracteole 1.3–1.8 cm long, bidentate or very shortly bifid. *Flowers* small, pink, only slightly irregular. *Perianth tube* 0.8–1.3 cm long, geniculate shortly above the middle, somewhat abruptly expanded and funnel-shaped above; *lobes* patent, acute, the dorsal slightly larger than upper laterals, oblong or oblong-ovate, 2–2.5 cm long, 1–1.3 cm wide; 3 lower 1.9–2.1 cm long, the laterals oblong-lanceolate or elliptic, about 1 cm wide, and lowest lanceolate, 7 mm wide. *Stamens* arising near middle of tube, the filaments reaching top of tube and anthers about middle of dorsal lobe; anthers linear, subsagittate, minutely apiculate, 0.8–1 cm long. *Style* reaching top of anthers or a little below, with oblanceolate or spatulate conduplicate branches 3.5–4 mm long.

A very rare species from the Natal Drakensberg growing on basalt outcrops on north facing slopes at altitudes from 2 000 to 3 000 m, flowering in December–January.

NATAL.—Estcourt: Giant's Castle, Symons sub TRV 25297 (PRE), Trauseld 960 (PRE). Underberg: Bushmans Peak, 3 170 m, Symons 336 (BOL). Weenen: 'Culvers', 2 000 m, Rogers 28175 (Z).

A very distinct and apparently rare species, if the fact that there are only four records is a real guide. As it occurs only at high altitudes and flowers during the hottest months, when not very much collecting is done, this might account for its not having been collected more often.

According to Frank Bolus, who described the species from two dried specimens in the Bolus Herbarium, it is distinguished by the shape of the perianth lobes, the somewhat genuflexed and narrow tube and by the length of the anthers—which are unusually long for so small a flower.

The species was named after Mr R. E. Symons, who early in this century was Conservator of the Giant's Castle Game Reserve in Natal. He was a keen collector of birds' eggs as well as of plants.

68. ***Gladiolus punctulatus*** Schrank in Bot. Ges. Regensb. **2** : 216 (1822). Type: Cape, *Brehm* in herb. Schrank (BRU, holo.). (See fig. 38.)

Common name: Pypie.

Corm subglobose or ovoid, 1.8–3 cm diam., with tunics of dark or reddish brown vertical fibres connate above the middle, usually firm, wiry and matted, extending up in a soft fibrous neck 2.5–8 cm long. *Stem* slender, simple, 25–80 cm high, usually 35–55 cm, more or less flexuose above the middle, with 2 (rarely 3) basal sheaths, the outer obtuse, hyaline, sometimes brown at the apex, 3–12 cm long, inner up to 15 cm, acute or obtuse, pubescent, usually ferruginous at the apex and purplish or green and purplish below. *Leaves* 3, the 2 lower with long striate pilose sheaths enclosing about $\frac{3}{4}$ of stem, the lowest with a linear or lanceolate blade as long as the sheath, usually reaching

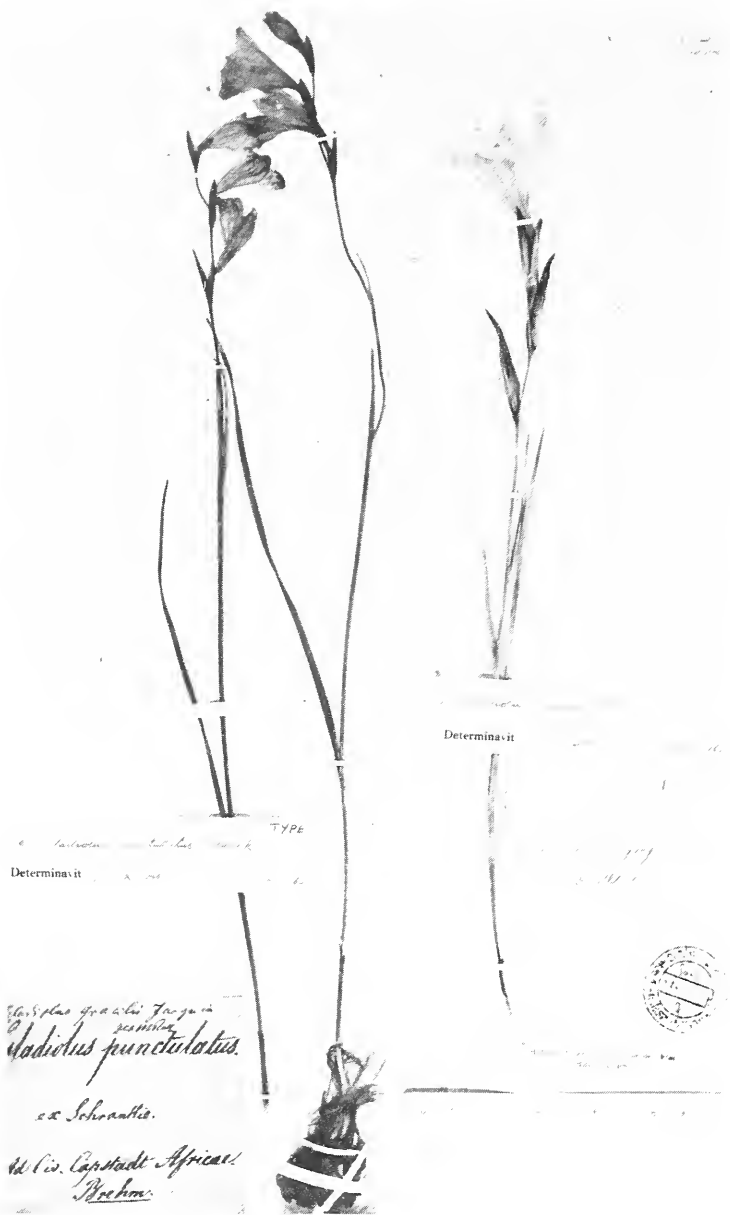
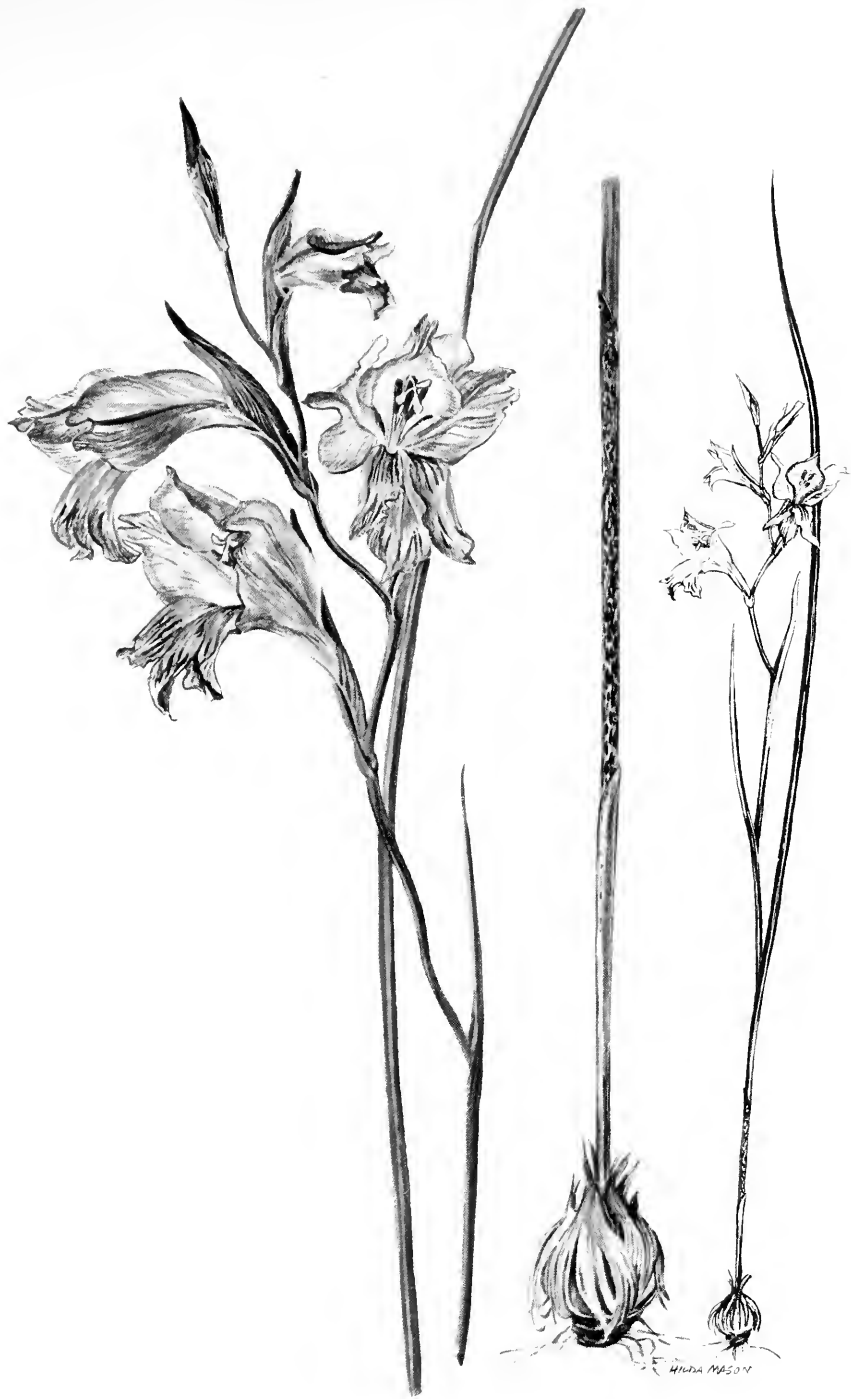


FIG. 38. Type of *G. punctulatus* Schrank. (Brehm in herb. Schrank, Brussels).

Photo: By courtesy 'Jardin Botanique', Brussels.





about the middle of stem, or a little above, 2–6 mm wide, more or less pilose or glabrous, firm with cartilaginous margins and 2–5 fairly prominent veins, second with a much longer sheath and shorter blade, and uppermost usually 2,5–8,5 cm long, rarely up to 15 cm, half sheathing, acuminate. *Spike* secund, 2–8-flowered, rarely 1. *Bract* oblong or oblong-lanceolate, acuminate to sub-obtuse, 1,8–3 cm long; bracteole slightly shorter and wider than bract, minutely bidentate. *Flowers* smallish, 4–5 cm long, more or less funnel-form with the lower lobes partly recurved and sometimes the tip of the dorsal, pale to deep pink, pinkish mauve or mauve with a few fine, reddish, orange or purple lines or streaks in lower half of 3 lower lobes and usually the lower half of lower laterals white or yellow. *Perianth tube* 1,2–2 cm long (rarely up to 3 cm), curved near middle, funnel-shaped; *lobes* obtuse or the dorsal usually obtuse and others subobtuse to acute, the dorsal often broader than others, obovate, 2–2,8 cm long, 1,3–2,2 cm wide and upper laterals similar but smaller, occasionally obovate-elliptic; 3 lower subequal or lowest slightly shorter and broader than laterals, obovate, obovate-oblong, somewhat cuneate or occasionally nearly elliptic, 2,3–3 cm long, 0,6–1,2 cm wide, connate for 5–8 mm at the base. *Stamens* arcuate, arising 5–9 mm below top of tube; filaments 1–1,6 cm long; anthers linear, subsagittate, 7–9 mm long. *Ovary* ellipsoid or oblong, 3–5 mm long; style reaching to middle or top of anthers, with oblanceolate or spatulate conduplicate branches 3,5–5 mm long. *Capsule* oblongo-ovoid, 2 cm long, thin-walled; *seeds* 8 mm long, the wing fairly narrow.

A common species widespread in the Cape winter-rainfall region from Piketberg to Bredasdorp (the variety *autumnalis* occurring further east in the Heidelberg and Riversdale districts) in sandy soil on flats and on mountains, up to 1 300 m altitude, flowering July to October, the variety *autumnalis* in April.

Two varieties are recognized.

KEY TO VARIETIES

- | | |
|---|-----------------------------|
| Inner basal sheath pubescent; lowest leaf with the blade as long as the sheath;
flowering July to October; widely distributed and common from Piketberg
to Bredasdorp | (a) var. <i>punctulatus</i> |
| Inner basal sheath glabrous; lowest leaf with a blade $\frac{1}{4}$ – $\frac{1}{2}$ as long as sheath;
flowering in April; rare in the Heidelberg and Riversdale districts on the
Langeberg Mountains | (b) var. <i>autumnalis</i> |

(a) var. **punctulatus**

G. punctulatus Schrank in Denks. Bot. Ges. Regensb. **2** : 216 (1822); Lewis in Bot. Notiser **119** : 291 (1966). Type: Cape, *Brehm* in herb. Schrank (BRU, holo.).

G. tristis var. 1, Thunb., Diss. Glad. 12 (1784). *G. laccatus* Thunb., Prodr. 186 (1800), Fl. Cap. ed. Schult. 45 (1823); N.E. Br. in J. Linn. Soc. **48** : 24 (1928); non Jacq. 1790. Type: Cape, Thunberg 1037 (UPS, holo.). *G. hirsutus* var. *villosiusculus* Ker in Curtis's bot. Mag. sub t.727 (1804), Curtis's bot. Mag.

t.823 (1805). *G. villosiusculus* Soland. ex Bak. in J. Linn. Soc. **16** : 174 (1877) in syn. *G. biflorus* Roem. & Schult., Syst. **1** : 416 (1817); non Thunb. 1784. *G. villosus* Ker, Gen. Irid. 133 (1827) excl. syn. *G. puniceus* et *G. lamarkii*; Bak., Handbk. Irid. 210 (1892), Fl. Cap. **6** : 149 (1896); Lewis in Adamson & Salter, Fl. Cape Penins. 258 (1950); non Burm. f. (1768). Type: Curtis's bot. Mag. t.823. *G. pilosus* Eckl. ex Klatt in Linnaea **32** : 709 (1863); Lewis in Adamson & Salter, Fl. Cape Penins. App. 841 (1950). *G. pilosus* Eckl., Top. Verz. 38 (1827) nom. nud. Type: Cape, Cape Flats near Wynberg, Ecklon (S, holo.).

It is remarkable that a species as common and well known as this has not been figured more often, the reason perhaps being that it does not do well in cultivation. Like many of the common species, its name has undergone a number of name changes. It was first placed as one of several varieties of *G. tristis* L. by Thunberg in 1784 but in 1800, in his *Prodrum Plantarum Capensium*, he described the plants collected by himself under the name *G. laccatus*, citing *G. laccatus* Jacq. (1790). This is a misidentification as the plant figured and described by Jacquin is a *Watsonia* (= *W. humilis* Mill.), so Thunberg's name cannot be retained for this species.

In 1805 it was illustrated by Ker in *Curtis's Botanical Magazine* (t.823) as a variety of *G. hirsutus* Jacq. (= *G. caryophyllaceus* (Burm. f.) Poir.). In the synonymy Ker cited Breyn., Cent. 24, t.12 f.1, but Breynius's figure, published in 1739, is not a good one and it is difficult to say with any certainty whether or not it represents this species. No hairs are shown on the leaves, nor are they mentioned in the description, although they are fairly conspicuous and can usually be seen without the aid of a lens. In 1827 Ker raised the variety to specific rank, as *G. villosus*, and this name was upheld by Baker in his *Handbook of the Irideae* and the *Flora Capensis*. Evidently both Ker and Baker overlooked the fact that the name had already been used by Burman f. in 1768 for another plant (now known as *Synnotia villosa* (Burm. f.) N.E. Br.), and was not available for this one.

G. puniceus Lam. (1786), which was renamed *G. lamarkii* by Roemer and Schultes in 1817, was cited by Ker as a synonym of *G. villosus*, but this is not correct. From Lamarck's description and the specimen Lewis had seen in his herbarium, his plant appears to be the pink colour form of *G. gracilis* Jacq.

In 1950, in an appendix to Adamson & Salter's *Flora of the Cape Peninsula*, Lewis stated that the name *G. villosus* Ker should be replaced by *G. pilosus* Eckl. ex Klatt. However, after examination of the type of *G. punctulatus* Schrank in the Brussels Herbarium she was able to confirm that it is the same species and as this name is older it takes precedence over Ecklon's.

On Schrank's type sheet there are three specimens but the one on the right, marked f, which is added to the sheet, is *G. carneus* Delaroche. The label with the name *G. punctulatus*—collected near Cape Town by Brehm—obviously belongs to the specimens marked d and e which agree with Schrank's fairly detailed description.

CAPE.—Caledon: Between Viljoen's Pass and French Hoek Pass, *Stokoe* (SAM 60160), Steenbras Mts, *Sidey* 2194 (S); Hangklip, *Barker* 8039 (NBG); Betty's Bay, *Topper* 151 (NBG); Palmiet River mouth, *Davis* (SAM 60221); Houhoek, *Bowie* 26 (BM); near Bot River, *MacOwan* 2677 b (BM, G), s.n. (BOL, K); Bot River, Langehoogte, Bontjeskraal, *Zeyher* 3983 (G, K, P, PRE, S, SAM, Z), *Pappe* (BM); Hermanus, *Schur* (NBG); Shaw's Pass, *Martin* 1163 (NBG), *Bean* (NBG); Genadendal, *Pappe* (K), *Roser* (PRE). Cape Peninsula: near Cape Town, *Prior* (K), *Bolus* 4724 (K), *Brehm* (BR); *Rogers* 11353 (Z); Signal Hill, *Rogers* 27210 (Z); Little Lion's Head, *Barker* 188 (BOL, NBG); Camps Bay, *Pappe* (SAM), *Steyn* 188 (NBG); Hout Bay, *Schlechter* 1220 (BM, G, GRA, K, S, Z); Table Mt., *MacOwan* (SAM 48595), *Gamble* 22107 (K), *Rogers* 11388 (G, Z); Cape Flats near Rondebosch, *Bolus* 4724 (BM, BOL, PRE); Cape Flats near Claremont, *Dod* 515 (BOL); College Ranges (Rondebosch), *Dod* 588 (BM, K); Wynberg, *MacOwan* HNAA 288 (BM, BOL, G, K, P, SAM, UPS); Cape Flats near Wynberg, *Ecklon* (S—type of *G. pilosus*); Cape Flats, *Marloth* 7912 (PRE), *Ecklon* & *Zeyher* 149 (B, G, SAM), 159 (G, K, LD, SAM), s.n. (AMD); Orange Kloof, *Dod* 3285 (BM, BOL, K); Constantia, *Wilms* 3698 (AMD, BM, G, K, L, P, Z); Vlakkenberg, *Taylor* 1823 (NBG); Constantiaberg, *Krauss* (G); Tokai, *Compton* 17453 (NBG); Steenberg, *Salter* 8224 (SAM); Muizenberg Mt., near Silvermine Stream, *F. Bolus*, *Bolus* Herb. 14765 (BOL, K); Silvermine valley, *Salter* 335/12 (BM); Kalk Bay, *Wilms* 3697 (BM); Fish Hoek Flats, *Salter* 7402 (SAM), *Peers* (BOL); Schusters Kraal, *Compton* 5969 (BOL), 14639 (NBG); Redhill, *Jameson* (K); Cape Flats, Doornhoogte, *Zeyher* 1629 (Z). Ceres: Kluitjeskraal Forest Station, *Van Breda* 1242 (PRE); Witsenberg Vlakte, *Pappe* (BM, SAM 21293), *Leighton* 3148 (BOL); De Keur, *Barker* 3106 (NBG), *Esterhuysen* 13008 (BOL); Cold Bokkeveld, *Rycroft* 2533 (NBG); ditto, near Leeurivier, *Lewis* 2653 (SAM); Gydo Pass, *Middlemost* 1722 (NBG); Gydo Mts, *Bolus* 8391 (BOL). Somerset West: Sir Lowry's Pass, *Guthrie* 112 (BOL), *Pillans* (BOL 14850), *Schlechter* 1147 (GRA, Z), *Stokoe* (SAM 63491, 63492), *Barker* 7333 (NBG), *Van Niekerk* 391 (BOL, K), *Elliot* 1120 (K); Helderberg, *Begley* (SAM 10352); foot of Sugar Loaf, *Esterhuysen* 17389 (BOL, PRE); Hottentots-Holland, *Verreaux* (G), *Zeyher* (S), *Pappe* (SAM 70664). Stellenbosch. Jonkershoek, *Taylor* 3692 (NBG), 4943 (PRE), *Lewis* 1658 (NBG, SAM); Stellenbosch Mt., *Garside* 1504 (K); Simonsberg, *Strey* 566 (PRE); Banghoek, Spitskop, *Esterhuysen* 11868 (BOL, NBG, PRE); Klein Drakenstein Mts, *Drège* 8433 a (G, K, P, S), 8433 b (P). Paarl: Dutoitskloof, *Drège* 4833 (P), 4833 b (B, BM, CGE, G, K, L, OXF, S, SAM), *Esterhuysen* 15723 (BOL, PRE), *Compton* 21960 (NBG), *Barker* 5377, 8027 (NBG), *Rycroft* 2515 (NBG), *Sidey* 2112 (S), *Martin* 1202 (NBG); Molenaar's Peak, Dutoitskloof, *Stokoe* (SAM 59743), *Compton* 20130 (NBG), *Esterhuysen* 14078 (BOL, GRA, NBG); Seven Sisters Mt., *Esterhuysen* 15810 (BOL, NBG); near Paarl, *Rogers* 11388 (PRE); Wemmershoek Mts, *Wasserfall* 480 (NBG), *Esterhuysen* 9062 (BOL); French Hoek, *Phillips* 1320 (SAM), *Sidey* 1859 (PRE, S); French Hoek Forest Reserve, *Salter* 6883 (BOL, SAM); Simondium, *Schelphe* 4151 (BM). Piketberg: Near Piketberg, *Bolus* s.n. (BOL); Clanwilliam-Piketberg, *Godman* 790 (BM). Tulbagh: Roodesand, *Stokoe* (BOL); Tulbagh Valley, *Esterhuysen* 17539 a (BOL). Wellington: Wellington, *Heathley*, herb. Moss 6355 (BM). Worcester: Bain's Kloof, *Salter* 6825 (BOL), *Lotsy* & *Goddijn* 869 (L), *Grant* 2233 (BOL, PRE); Stettynsberg, *Esterhuysen* 15592 (BOL, NBG), *Stokoe* (SAM 60161); mountain slopes S.W. of Brandvlei. *Nordenstam* 520, 522 (NBG); without precise locality, *Cooper* 1667 (K).

(b) var. **autumnalis** Lewis var. nov. a var. *typica* vagina interiore basali hypogaea glabra incolori, folii basalis lamina breviori, floribus minoribus florifera Aprili differt.

Type: Cape, Riversdale district, Garcia's Pass, south side, *Lewis* 5380 (NBG, holo.).

Corm and *stem* as in var. *punctulatus* but stem usually straighter and inner basal sheath not emerging above ground, glabrous, colourless, up to 8 cm long. *Leaves* 3 or occasionally 4, as in var. *punctulatus* but blade of lowest shorter, $\frac{1}{4}$ – $\frac{1}{2}$ as long as sheath, and fourth when present usually reduced to a short acute sheath. *Bract* slightly smaller, 1.8–1.4 cm long. *Flowers* as in var. *punctulatus* but slightly smaller, pale to deep pink with a few darker streaks on lower lobes, the perianth tube 1.5–1.8 cm long, dorsal lobe 2–2.5 cm long, 3 lower lobes 1.8–2.3 cm long and anthers 6 mm long.

Occasional in peaty soil on lower mountain slopes of the Langeberg, Cape, in the Heidelberg and Riversdale districts, flowering in April.

CAPE.—Heidelberg: Grootvadersbos, *Lewis* 5446 (NBG). Riversdale: Garcia's Pass, south side, *Lewis* 5380 (NBG), *Leighton* NBG 934/35 (BOL).

In addition to the small differences mentioned above this variety is also distinguished by its earlier flowering period, in the autumn instead of winter to spring months, and its more eastern distribution, on the slopes of the Langeberg range in the Heidelberg and Riversdale districts.

69. **Gladiolus carinatus** Ait., Hort. Kew. 1 : 64 (1789). Type: Cape Masson 1774; a specimen that flowered at Kew Gardens (K, holo.).

Common names: Sandpypie; Mauve or Blue Afrikaner.

Corm subglobose, 1–2 cm diam., occasionally to 3 cm, the tunics pale or reddish brown, soft to moderately firm, connate above the middle and slit up into acuminate teeth below. *Stem* slender, about 20 cm to 1 m high, usually 25–50 cm, more or less flexuose, sometimes markedly bent and twisted, with 2 or 3 basal sheaths, the 1–2 outer pallid, obtuse or truncate, the inner usually considerably longer, mottled or spotted with white on pale or dark green, purple or brownish green, sometimes minutely puberulous. *Leaves* 3, the lowest with a long faintly striate sheath and long linear blade usually reaching top of stem or well above, sometimes shorter and reaching below base of spike, 1–8 mm wide, soft and grass-like with only the midrib prominent or sometimes firmer with fairly prominent margins; 2 upper much shorter, the middle one with a much longer sheath and shorter blade. *Spike* secund, fairly lax, 2–9-flowered (rarely 1). *Bract* lanceolate, linear-oblong or oblong, acuminate, acute or obtuse, 4.5–2 cm long, the lowest occasionally up to 6 cm, with narrow hyaline margins; bracteole shorter than bract, obtuse or minutely bidentate. *Flowers* fairly small, 4–6 mm long, commonly more or less funnel-form with upper part of lobes recurved, sometimes more widely open and somewhat campanulate, or narrower and bilabiate, sometimes with the lower lip projecting a little beyond the upper, in colours ranging from pale greyish blue to deep blue or violet, mauve, pale pink to reddish, and pale yellow to rich golden brown, the upper lobes often with a deeper medial stripe and the lower with an irregular yellow band near the middle usually with purplish streaks or dots above and below, the common form fragrant, others scentless and the yellow sometimes with a faint spice-like scent. *Perianth tube* 1.2–1.8 cm long, curved near middle, slender below and funnel-shaped above; *lobes* obtuse, occasionally retuse, to acute; dorsal more or less hooded, usually obovate, 2.5–3.8 cm long, 1.5–2.5 cm wide, sometimes obovate-oblong or less often elliptic and 1–1.5 cm wide; upper laterals usually slightly smaller than dorsal, similar in shape or more often broadly elliptic rather than obovate; 3 lower more or less unguiculate, 2.5–3.5 cm long, connate for 3–6 mm at the base, the laterals usually spatulate or oblong-unguiculate, 0.7–1.1 cm wide (rarely 4–7 mm), and lowest larger, up to 1.7 cm wide, sometimes with an elliptic or somewhat rhomboid blade. *Stamens* arcuate, arising 5–8 mm below top of tube; filaments 1.2–1.5 cm long; anthers linear, subsagittate, 0.7–1.2 cm long. *Ovary* ellipsoid, 5–8 mm long; style reaching top of anthers or shortly below, the branches

oblong-unguiculate, spatulate or obcordate-spatulate, conduplicate, 3–5 mm long. *Capsule* ellipsoid, 1.5–2.5 cm long, pallid, thin-walled; *seeds* broadly winged, oblong-orbicular or obovate-oblong, about 1 cm long, yellow-brown.

Common and widely distributed in the western and south-western Cape, on sandy flats, especially among Restionaceae, in sandy soil and on mountain slopes, flowering from July to September or occasionally June in the northern districts.

Two subspecies are recognized.

KEY TO SUBSPECIES

- Flowers 3–6 cm long; widely distributed (a) *ssp. carinatus*
 Flowers 2.5–3 cm long; confined to coastal dunes near Cape Town (b) *ssp. parviflorus*

(a) *ssp. carinatus*.

G. carinatus Ait., Hort. Kew. **1** : 64 (1789); Gmel., Syst. Nat. **7** : 111 (1796); Willd., Sp. Pl. **1** : 211 (1798); Vahl, Enum. **2** : 82 (1806); Poir. in Lam. Encyc. Suppl. **2** : 790 (1812); N.E. Br. in Gard. Chron. Ser. 3, **93** : 290 (1933); Lewis in Adamson & Salter, Fl. Cape Penins. 261 (1950); Kidd, Wild Flrs Cape Penins. t.60 f.3 (1950); Rice & Compton, Wild Flrs Cape of Good Hope t.208 f.2 (1951). Type: Cape, without precise locality, *Masson* (1774); a specimen that flowered at Kew Gardens (K, holo.).

G. alatus sensu Schneev., Ic. t.12 (1792); non L. 1760. *G. odoratus* Salisb., Prodr. 40 (1796), *nom. illegit.* *G. punctatus* Jacq., Coll. **4** : 160 (1792), Ic. t.247 (1795). Type: Cape Ic. t.247. *G. ringens* Andr., Bot. Rep. t.27 (1790), t.227 (1802); Red., Lil. t.123 (1805); Eckl., Top. Verz. 37 (1827); Fl. des Serres, Ser. 1, **4** : t.422 (1848). Type: Andr., Bot. Rep. t.27. Painted from a specimen that flowered at Kew Gardens. —var. *undulatus* Andr., Bot. Rep. t.275 (1803). Type: Andr., Bot. Rep. t.275. *G. tristis* L. var. *inodorus* Thunb., Diss. Gladiolus n. 8 (1784). *G. laevis* Thunb., Prodr. 184 (1800), Fl. Cap. ed. Schultes 42 (1823); Ker, Irid. Gen. 135 (1827) excl. syn. *G. versicolor* var. (e) *binervis* Ker.¹ Type: Cape, *Thunberg* 1038 (UPS, holo.). *G. recurvus* sensu Ker in Curtis's bot. Mag. t.578 (1802), Irid. Gen. 138; Spreng., Syst. Veg. **1** : 151 (1825). Reichb., Fl. Exot. **1** : t.32 (1834); Loudon, Ladies Fl. Gard. Orn. Bulb. Pl. t.10 (1841). Baker, Handbk. Irid. 203 (1892), Fl. Cap. **6** : 139 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 223 (1893). Marloth, Fl. S. Afr. **4** : t.47 D (1915). L. Bolus, Barclay & Steer, First Bk. S. Afr. Flrs t.137 (1928). Protected Wild Flow. Cape Prov. series B, t.51. non L. 1767. *G. violaceus* Pers., Syn. **1** : 43 (1805) *nom. illegit.* *G. suaveolens* Zeyher ex Klatt, in Linnæa **32** : 711 (1863) excl. syn.; non Ker 1827. Type: Cape near Constantia, *Ecklon & Zeyher* 150 (G, iso.). *G. niveni* Bak., Handbk. Irid. 210, Fl. Cap. **6** : 149; Dur. & Schinz, Consp. Fl. Afr. **5** : 221. Type: as for *G. ringens* var. *undulatus*. *G. superans* N.E. Br. in Gard. Chron. Ser. 3, **92** : 467 (1932). Type: Cape, Riversdale district, without precise locality, *Muir* 4850 (K, holo.).

¹ This latter variety is possibly a hybrid between *G. carinatus* and *G. lilaceus*.

COLOUR PLATE 17. HILDA MASON.—Top of flower spike; corm and base of stem enclosed in spotted basal sheaths; sketch of plant much reduced.

Cape—Malmesbury: between Darling and Hopefield. *Mason* August 1970.

CAPE.—Bellville: Tygerberg, *Pappe* (BM, K, SAM), *Ecklon* 13 (OXF, P, PRE); Tigerberg, near Duikervlei, *Ecklon* (S); 37 km from Cape Town on Mamre road, *Barker* 4595 (NBG); Melkbos road, *Barker* 1785 (NBG). Bredasdorp: Nachtwacht Farm, *Smith* 2961, 3025 (PRE); The Poort, *Barker* 2476 (BOL, NBG), 5546 (NBG), *Morris* 270, 282 (NBG); Potteberg *Esterhuysen* 23339 (BOL); near Bredasdorp, *Bolus* s.n. (BOL), *Breach* (BOL), *Thomas* (NBG). Caledon: Hottentots-Holland, *Bowie* 24 (BM); Stanford-Gansbaai road, *Gillett* 4263 (BOL); between Caledon and Napier, *Esterhuysen* (BOL). Calvinia: Lokenburg, *Acoks* 18866 (K, PRE); 6 km from Nieuwoudtville, *Salter* 4557 (BM, BOL, K). Cape Peninsula: Hout Bay, *Middlemost* 1575 (NBG); Karbonkelberg, *Barker* 1281 (NBG); Signal Hill, *Rogers* 27211 (Z); near Cape Town, *Bolus* 4591 (BOL, K, Z), *Brehm* (BR); Camps Bay, *MacOwan* 2276 (SAM), 2558 (K); near Constantia, *Ecklon & Zeyher* 150 (G—isotype of *G. suaveolens* Klatt); near Diep River, *MacOwan* HNAA 286 (BM, BOL, G, K, P); Muizenberg, *Krauss* (G) *Schlechter* 1582 (Z); Clovelly *Salter* 334/9 (BM); Fish Hoek Mts, *Peers* (K); near Kommetjie, *Fair* in herb. *Bolus* 7989 (BM, BOL, K); Cape Point, *Edwards* in herb. *Bolus* 14814 (BOL, K). Ceres: Witsenberg Vlakte, *Leighton* 3147 (BOL, K); Elandsloof, *Barker* 3797 (NBG), *Compton* 17330 (NBG); Ertjieslandkloof, *Barker* 3030 (BOL, NBG, PRE); Gydo Pass, *Leighton* (BOL), *Lewis* 2654 (SAM), *Leipoldt* 3837 (BOL, PRE), *Acoks* 2228, 2229 (S); Ceres, *Rogers* 28736 (Z), *Edwards* in herb. *Bolus* 14806 (PRE); *Leslie* in herb. *Marloth* 13470 (PRE); top of Theronberg, *Hall* 532 (NBG); Waboomsriver, Cold Bokkeveld, *Lewis* 1338 (SAM). Clanwilliam: between Middelpaas and Calvinia, *Leipoldt* 4079 (BOL); Cedarberg, *Primos* in herb. *Marloth* 11707 (PRE), *Wagner* 138 (NBG); Wupperthal, *Marloth* 7407 (PRE); Driehoek Valley, *Esterhuysen* 8114 (PRE); Nardou Pass, *Salter* 3520 (K); Nieuwoudt Pass, *Lewis* 6141 (NBG); Matjiesrivier, *Wagner* 138 (NBG); Knarkarberg, *Drège* (P); between Berg valley and Lange valley, *Drège* (K); Langekloof, *Schlechter* 8393 (BM, GRO, G, L, P, PRE, S, Z); Clanwilliam, *Mader* in herb. *MacOwan* 2193 (K); Warmbaths, *F. Bolus*, herb. *Bolus* 14624 (BOL), 14625 (BOL, K, PRE); The Baths, Modderfontein, *Compton* 5390 (BOL); Pikeniers Kloof, *Schlechter* 7956 (BM, G, K, PRE, Z); between Graafwater and Clanwilliam, *Lewis* 6145 (NBG); between Algeria and Uitkyk, *Taylor* 1651 (NBG). Hopefield: Saldanha Bay, *Drège* 8428 (P), *Ecklon & Zeyher* 150 (S); Hopefield, *Bachmann* 1961 (Z), *Bolus* 12854 (BOL), *Pattison* in herb. *Bolus* 14752 (BOL, K); Koperfontein, *Lewis* 5983 (NBG); Danger Bay, near Saldanha, *Lewis* 5986 (NBG); near Langebaan, *Leighton* 1720 (BOL), s.n. (PRE); near Vredenburg, *Thomas* (NBG). Knysna: between Groenevlei and Swartvlei, *Burchell* 5683 (K, partly, P); Plettenberg Bay, *Rogers* 26694 (Z); Lake Pleasant, *Acoks* 21373 (PRE). Laingsburg: Elandsfontein, Witteberg, *Compton* 3794, 3814 (BOL); Witteberg, *Logan* (BOL). Malmesbury: between Malmesbury and Moorsburg, *Esterhuysen* 5531 (BOL); between Ysterfontein and Darling, *Ross-Frames* (K); near Ysterfontein, *Barker* 454 (NBG); near Darling, *Salter* 1282 (BM), *Marloth* 7016 (PRE); Darling Flora Reserve, *Rycroft* 3134 (NBG); Geelbek, *Barker* 4619 (NBG); near Mamre, *Salter* 6225 (BOL), *Compton* 15861 (NBG). Milnerton: *Letty* (PRE), *Davis* (SAM 60875), *Lewis* 74 (SAM). Montagu: 9–10 km E. of Montagu on Barrydale road, *Barnard* (NBG). Paarl: Suid-Agter-Paarl, Weltevreden Farm, *De Villiers* (NBG); Berg River, near Paarl, *Drège* 8434 (P, S); Kraaifontein, *Hafström & Acoks* 289 (PRE, S); between Durbanville and Paarl, *Lewis* (BOL). Piketberg: 22 km N. of Piketberg on Reddinghuis road, *Barker* 6374 (NBG); 9 km S. of Reddinghuis on Aurora road, *Lewis* 5994 (NBG); near Sauer, *Middlemost* 1851 (NBG); between Eendekuil and Het Kruis, *Lewis* 5993 (NBG); between Veldrif and Aurora, *Lewis* 5992 (NBG); 6 km S. of Aurora, *Lewis* 5991 (NBG); top of mountain above Porterville, *Loubser* 971 (NBG). Riversdale: between Albertinia and Riversdale, *Martin* 1181 (NBG); Still Bay—Blombos road, *Wurts* 1523 (NBG); near Gouritz River, *Bowie* 132 (BM); Albertinia, *Sidley* 1758 (PRE, S), *Topper* 436 (NBG), *Muir* in herb. *Galpin* 5474 (PRE); Oude Tuin, near Albertinia, *Muir* 1616 (BOL); Albertinia Duinen, *Muir* 1767 (BOL); between Albertinia and Mossel Bay, *Van Breda* 1144 (PRE); without precise locality, *Muir* 4850 (K—type of *G. superans*). Robben Island: Robben Island, Table Bay, *Walgate* 516 (SAM). Stellenbosch: Hasendal, Kullis River, *Rycroft* 2292, 2294 (NBG); Bottellary Hills, *Acoks* 2454 (S); Stikland, *Acoks* 578 (S); Stellenbosch, *Sanderson* 953 (K), *Garside* 1511 (K). Tulbagh: New Kloof, near Tulbagh, *Burchell* 1004 (K); near Wolsey, *Salter* 4684 (BM). Vanrhynsdorp: top of Van Rhyn's Pass, *Salter* 7334 (SAM), *Nordenstam* 677 (NBG); Sandveld, near Nuwerus (Nieuwerust), *Marloth* 8272 (PRE); between Knersvlakte and Sandveld, *Leipoldt* 3836 (BOL); Heerenlogementberg, *Esterhuysen* 5591 (BOL), *Lewis* 6146 (NBG), *Compton* 10954 (NBG). Wellington: Bain's Kloof, *Grant* 2284 (BM), *Acoks* 292 (S). Worcester: Stettynskloof, *Barker* 9458 (NBG), *Leipoldt* 3382 (BOL); Hex River valley, *Du Toit* (BOL 12555), *Dod* 2757 (BOL, K); near Worcester, *Van Niekerk* 586 (BOL, K), *Steyn* 204 (NBG); Brandwagt, *Van Breda* 916 (PRE), *Walters* 161 (NBG); Botha's Halt, *Van Breda* 903 (K, PRE); Orchard, *Esterhuysen* 10290 (BOL, PRE); Goudini Baths, *Marloth* 13093 (PRE); Bokkervier farms, *Middlemost*, NBG 658/63 (NBG); N. end Bain's Kloof, *Hafström & Acoks* 292 (PRE); Brandvlei, *Lewis* 6197 (NBG). Wynberg: Cape Flats, Doornhoogte, *Zeyher* 1628 (G, K, P, SAM), *Dod* 510 (BOL); Cape Flats, *Prior* (K), *Moyle Rogers* (BM), *Marloth* 7014, 7015 (PRE); Raapenberg Farm, *Dod* 2764 (K); Uitvlug, *Dod* 1514 (BOL, K).

WITHOUT LOCALITY: Prior (K); Pappe (K); Cooper (K); Harvey 62 (BM); Oldenburg 427, 802 (BM); Kolbing 25 (LE); Bergius 364 (L, P); Lalande (BR); Drège 9583 (P); Burman (G); Willdenow 924 (B); Jussieu 3640 (P); Brehm 183 (M); Thunberg (UPS, sheet 1038 in herb. Thunberg, type of *G. laevis*).

HYBRIDS

G. carinatus × *G. tenellus*.—Ceres: Cold Bokkeveld, Driefontein, Marloth 6140 (PRE).

G. carinatus × *G. alatus*.—Paarl: Suid-Agter-Paarl, Weltevreden Farm, De Villiers (NBG).

It is not possible to provide a brief description of this very variable species, one of the commonest and most widespread in the south-western Cape Province. Like so many of the common ones it has had several different names, as can be seen in the synonymy, and for more than a century was incorrectly known as *G. recurvus* L. The mistake dates back to 1802 when Ker published an illustration under that name in *Curtis's Botanical Magazine* t.578, and he was followed by most of the later botanists, including Baker in the *Flora Capensis*, and Marloth in his *Flora of South Africa*. It is difficult to understand how such an error could have persisted for so long, as *G. carinatus* is quite distinct from *G. recurvus* L.—with its longer-tubed flowers, narrower, more tapering and recurved lobes, and no mottling on the basal sheath—but it was not rectified until 1933 when N. E. Brown pointed out in an article in the *Gardener's Chronicle* (p. 290) that the correct name for this species is *G. carinatus*.

The mottled or spotted sheath is a conspicuous distinguishing feature and in fact the common name given by Aiton when he described the species in 1789 was 'Spotted-stalked Corn-flag'. His description was drawn from a plant grown in Kew Gardens, introduced by Masson five years earlier, and named *carinatus* on account of the raised midrib on its narrow leaves.

Most of the colour variations are mentioned above in the description. Of these the deep pink or reddish is the least common, while the various yellowish forms, some tinged with mauve outside, are confined to the more inland districts and do not occur at the coast. These are either scentless or have a faint spice-like scent, not at all like that of the fragrant mauve-blue form which Ker described as 'smelling very powerfully like violets or orris-root'. Not all of the mauve or blue forms are scented.

There has been some confusion about the identity of *G. laevis* Thunberg, originally named *G. tristis* var. *inodorus* by Thunberg. Baker placed it as a synonym of *G. gracilis* in the *Flora Capensis*, and N. E. Brown, in his paper on the *South African Iridaceae* of Thunberg's Herbarium, stated that the plants on Thunberg's type sheet were *G. tenellus* Jacq. (*J. Linn. Soc.* 48: 24, 1928). In an article in the *Gardener's Chronicle* in 1933 (Ser. 3, 93 : 263), Collingwood Ingram expressed some doubt about accepting this identification and pointed out that there were certain discrepancies. The plant figured and described in his article is the same as Thunberg's *G. laevis*, which is the common yellow form of *G. carinatus*. The typical mottling on the basal sheath is clearly visible and can even be seen with a lens in a photograph of the type sheet, and the one-nerved

leaf, bracts and shape of the flower are quite unmistakable. It is of interest to note that Thunberg himself misidentified some of his own specimens and in the Retzius collection of Lund University Herbarium there are some duplicates of his distributed as *G. laevis* which actually are *G. tenellus* Jacq.!

In *Botanist's Repository* under t.27 of *G. ringens* (1797) Andrews informs us that 'The plants now in England have been imported from Holland from the collection of Messrs. Voorhelm & Co. who about the year 1793 purchased the largest collection ever formed at the Cape from a Frenchman who had been many years resident there'. Miss M. Gunn believes this to have been a Captain La Brousse from Luxembourg.

A very slender and delicate form, usually with only one to three flowers and the perianth lobes narrower, more elliptic and acute than usual, occurs at altitudes of 600–950 m in parts of the Calvinia to Piketberg districts, where it often flowers as early as June. In the Clanwilliam district it merges into the more typical form.

Two natural hybrids are recorded, and some of the best scented forms of *G. carinatus* have been used by Dr T. T. Barnard of Dorset, England, in producing some of his lovely delicate scented hybrids.

(*b*) ssp. **parviflorus** Lewis nom. et stat. nov. *G. tristis* L. var. *q. permeabilis* Thunb., Diss. Glad. 13 (1784). *G. punctatus* sensu Thunb., Prodr. 185 (1800), Fl. Cap. ed Schult. 44 (1823) excl. syn.; Bak., Handb. Irid. 209 (1892), Fl. Cap. 6 : 149 (1896); N.E. Br. in J. Linn. Soc. 48 : 28 (1928); non Jacq. 1792. Type: Cape, *Thunberg* 1058 (UPS, holo.).

Plant usually more robust than ssp. *carinatus*, with wider leaves and smaller flowers, up to 15 in a spike.

Corm, stem and leaves as in ssp. *carinatus* but stem often stouter, occasionally up to 1,25 m high, and leaves up to 1,1 cm wide. *Spike* usually denser than in ssp. *carinatus*, up to 15-flowered. *Flowers* small, funnel-form, usually fragrant, in dull or sombre shades of green, mauve, greyish or brownish green, the lower lateral lobes with a yellow or greenish yellow transverse band near middle, usually outlined in purple above and below. *Perianth tube* 0,8–1 cm long, as in ssp. *carinatus*; *lobes* usually acute or subobtusate, the dorsal usually obovate, 1,8–2,5 cm long, 1–1,5 cm wide, upper laterals slightly smaller, more or less elliptic, and 3 lower oblong-unguiculate, 1,5–2 cm long, 5 mm wide and subequal or lowest slightly larger than laterals and up to 8 mm wide. *Stamens* as in var. *carinatus* but filaments 7–8 mm long and anthers 6–8 mm. *Gynaeceum* as in ssp. *carinatus* but style branches not more than 3 mm long.

Recorded from around Cape Town, occasional among bushes on sand dunes near the coast, flowering June–July.

CAPE.—Bellville: Philadelphia, *Wasserfall* 204 (NBG); Melkbosstrand, *Horrocks* 9 (NBG). Cape: Bloubergstrand, *Loubser* 926 (NBG); Milnerton, *Botha* (NBG, SAM), *Barnard* (BOL, K); near Rugby, *Goulimis* (BOL); Paarden Island, *Thunberg* (UPS, sheet 1058 in herb. Thunberg). Wynberg: Zeekoo-vlei, *Bond* 1011 (NBG).

Thunberg collected this subspecies on Paarden Island in June 1772. He at first identified it with *G. permeabilis* of Delaroche. In his *Diss. Glad.* (1784) he lists it as *G. tristis* var. *g. permeabilis*. In the *Prodromus* (1800) he raised the variety to specific rank as *G. punctatus* quoting *G. punctatus* Jacq. and *G. permeabilis* in synonymy; and these synonyms were repeated in Schultes's edition of the *Flora Capensis*. The long description is based on the Paarden Island plant and shows that it is quite distinct from *G. permeabilis*; and with its thickened leaf and spike of nine or more small flowers fairly distinct from *G. carinatus* (*G. punctatus* Jacq.) which it resembles in having a spotted basal sheath. Baker treated it as a separate species, erroneously retaining Thunberg's name. In 1928 N. E. Brown commented on Thunberg's type that it was a distinct species which he could not match with any specimen at Kew. The plant was collected again on 19 June 1932 on Milnerton golfcourse by Dr T. T. Barnard (BOL, K) and has since been found in other areas, usually near the coast and always flowering in June. Having examined living plants, Lewis concluded that it must be considered as a small flowered variant of *Gladiolus carinatus* Ait. sufficiently distinct to be ranked as a subspecies.

70. *Gladiolus viridiflorus* Lewis, sp. nov., *G. carinato* affinis sed cormo majore tunicis imbricatis ligneis, floribus viridibus differt.

Cormus ovoideus vel subglobosus 2–2.5 cm diam. tunicis imbricatis grossis lignosis ad apicem reticulatis ad basin unguiculatis. *Prophylla* basalia 2 purpureo maculata. *Folium* basale $\frac{1}{2}$ – $\frac{3}{4}$ vaginans lineari-lanceolatum 7–27 cm longum molle gramineum glaucum, costa leviter prominenti; folium superum non-vaginans ad basin involutum. *Scapus* 18–25 cm longus flexuosus. *Spica* secunda laxa 4–7 flora rhache flexuosa. *Bracteae* oblongo-lanceolatae 3–5 cm longae glaucae margine hyalina. *Flores* fragrantés pallide virides flavo notati infundibuliformes lobi late ovati acuti lobo dorsali cucullato, lobis inferioribus recurvatis. Type: Cape, Calvinia district, between Nieuwoudtville and Kareebooms Farm, Lewis 6132 (NBG, holo.).

Allied to *G. carinatus* but distinguished by its larger corm with much coarser, lignified tunics, and the colour and scent of the flowers.

Corm ovoid or subglobose, 2–2.5 cm diam., with imbricate coarse more or less lignified tunics, reticulate at the top and slit up into acuminate teeth below. *Stem* moderately slender, simple, 18–50 cm long, usually 18–25 cm, very flexuose, with 2 obtuse basal sheaths, the outer hyaline, 2.5–5.5 cm long and inner white mottled with purple and green, minutely puberulous, 4.5–12 cm long. *Leaves* 3–4, the 2 lower with the lower $\frac{1}{2}$ or $\frac{3}{4}$ sheathing, sometimes minutely puberulous, and a linear-lanceolate blade 2–3 mm wide, spirally twisted, normally 4–7 cm long (up to 27 cm in cultivation), soft, grass-like and glaucous, with the midrib slightly prominent; uppermost cauline leaf 4–8 cm long (occasionally 11 cm), involute at the base but not sheathing. *Spike* secund or subsecund, laxly 4–7-flowered, the rhachis very flexuose. *Bract* oblong-lanceo-

late, subobtusate or obtuse, 3–5 cm long, glaucous, with narrow hyaline margins; bracteole much shorter than bract, bidentate at the apex. *Flowers* fragrant, pale green, the lower lateral lobes with an irregular yellow-green transverse band outlined in purple near the middle and lowest with a spatulate mark of the same colouring. *Perianth tube* 1,2–1,6 cm long, curved, funnel-shaped; *lobes* subunguiculate, acute or subacute, the dorsal hooded with the upper third perrect and others patent from the middle with recurved tips; 3 upper elliptic or broadly elliptic, the dorsal 2,4–3 cm long, 1–1,6 cm wide, and laterals slightly smaller; 3 lower 1,7–2,7 cm long, connate for about 3 mm, the laterals more or less oblong-spatulate, 4–7 mm wide, and lowest spatulate, longer than laterals and up to 1 cm wide. *Stamens* arcuate, arising 4–6 mm below top of tube; filaments 1,3–1,5 cm long; anthers linear, subsagittate, 6–9 mm long. *Ovary* ellipsoid, 4–7 mm long; style reaching to middle or nearly to top of anthers, with spatulate or oblanceolate conduplicate branches 3 mm long.

A rare species thrice collected in the western Cape, in the Namaqualand and Calvinia districts, occasional among karroid bushes on stony hills or mountain slopes, flowering May to July.

CAPE.—Calvinia: between Nieuwoudtville and Kareebooms Farm, *Lewis* 6132 (NBG). Namaqualand: Anenous Pass, *Nordenstam* 646 (NBG); 5 km from Springbok on Steinkopf road, *Thomas* (NBG).

The unusual colouring and scent of the flower are very similar to those of *G. orchidiflorus*, but the mottled basal sheath, leaves, bracts and vegetative characters in general resemble those of *G. carinatus*, to which this species is closely allied. The main characters which distinguish it are the hard, toothed and more or less woody corm tunics, and the scent and colouring of the flower, which is rather more widely open than it usually is in *G. carinatus*. Only the three collections cited above are known but this species flowers at a time when very little collecting has been done in the districts where it occurs and may therefore not be as rare as it appears to be. The plant illustrated was grown in the National Botanic Gardens, Kirstenbosch, and is taller and laxer than normal.

FIG. 39. From a painting by G. J. Lewis.—Inflorescence; corm showing mottled basal sheath and leaves; bract and bracteole; longitudinal section of flower. Cape.—Calvinia, near Nieuwoudtville, *Lewis* 6132 (NBG), ex hort. Kirstenbosch. May 1963.

71. **Gladiolus blommesteinii** L. Bol. in Ann. Bolus Herb. **3** : 183 (1924). Type: Cape, Caledon Wild Flower Show (BOL 14786, lecto.) and including var. *major* L. Bol. l.c. Type var. Caledon Wild Flower Show (BOL 14791).

Corm ovoid or subglobose, 1,2–2,2 cm diam.; tunics usually imbricate, brown, lignified, slit up from the base into narrow acuminate teeth, sometimes with a tuft of fine bristles up to 3 cm long at the top. *Stem* very slender, simple, 30–70



FIG. 39. *G. viridiflorus*.

cm high, more or less flexuose near the top, with 2 basal sheaths, the outer hyaline or brownish, obtuse or truncate, 2–8 cm long, inner up to 23 cm, acute, green or purplish, faintly striate. *Leaves* usually 4, the lowest with lower half or two-thirds sheathing, faintly striate, and a linear blade 0.5–2 mm wide, reaching below the spike or sometimes overtopping it, firm, with prominent margins and midrib; second similar but shorter and 2 upper much shorter with short subulate blades. *Spike* secund, 1–4-flowered. *Bract* lanceolate, ovate-lanceolate or oblong, acuminate or acute, closely veined, distinctly striate, 2–5 cm long; bracteole slightly shorter than bract, acute, subacute or obscurely bidentate. *Flowers* fairly small, more or less funnel-form with upper half of lower lobes deflexed, pale or deep pink, pale mauve or bluish, with lower half of lower lobes pale yellow or cream streaked with fine red or purplish broken lines. *Perianth tube* curved, 1.4–2 cm long, funnel-shaped or fairly slender nearly to top then somewhat abruptly expanded; *lobes* acute or subacute, occasionally acuminate or mucronulate, 2.5–3.5 cm long; 3 upper 1.3–1.9 cm wide, the laterals elliptic or ovate-elliptic and dorsal slightly larger, ovate or broadly elliptic, somewhat hooded with apex porrect; 3 lower connate for 3–4 mm at base, elliptic, 0.8–1.2 cm wide, subequal or lowest a little larger than laterals. *Stamens* arcuate, arising near middle of tube and reaching about middle of dorsal lobe; filaments 1–1.3 cm long; anthers linear, minutely apiculate, 0.7–1.2 cm long. *Ovary* oblong, 4–5 mm long; style reaching top of anthers or shortly below, with spatulate conduplicate branches 3–4 mm long.

Fairly frequent in the southern Cape mountainous region from Bredasdorp to Caledon, Stellenbosch, Paarl and Worcester, at altitudes up to 1 300 m, flowering from August to October.

FIG. 40. From a painting by G. J. Lewis.—Inflorescence; corm; flower front view; flower laid out; bract and bracteole.

Cape.—Paarl, French Hoek Pass, *Thomas* (NBG 85472). September 1966.

CAPE.—Bredasdorp: Napier, *Compton* 8992 (NBG). Caledon: Soetmelksvlei, Riviersonderend, *Grisbrook* in herb. Guthrie 3289 (BOL); near Steenbras Reservoir, *Salter* 4747 (BM, BOL, K); Steenbras Siding, *Stokoe* (SAM 58001); Elgin, *Van Blommestein* (BOL 15202), *Linley* (SAM 58317); Caledon, *Marloth* 7058 (PRE); Riviersonderend, *Esterhuysen* 18759 (BOL, NBG, PRE), *Stokoe* 8940 (BOL), s.n. (SAM); without precise locality, Caledon Wild Flower Show, nos. 14786, 14790, 14791, 16912 (BOL). Paarl: French Hoek Pass, *Compton* 6416 (NBG), *Esterhuysen* 18887 (BOL, PRE), *Barker* 7547 (NBG), *Sidey* 1869 (PRE, S), *Thomas* (NBG), *Wasserfall* 479 (NBG); Wemmershoek Mts, *Baker* 276 (NBG), *Esterhuysen* 9063 (BOL); French Hoek Forest Reserve, *Leighton* 288 (BOL), *Lewis* (BOL 27840), *Salter* 6985 (SAM); Berg River Hoek, *Compton* 13862 (NBG). Somerset West: Helderberg, *Parker* 3878 (BOL, K, NBG), *Esterhuysen* 14628 (BOL), *Martley* (BOL 27837); W. slopes of Hottentots-Holland Mts above Lourensford, *Esterhuysen* 9171 (BOL); Sir Lowry's Pass, *Acocks* 2178 (S), *Barker* 54 (K), *Loubser* 441 (NBG), *Stokoe* (SAM 63486). Stellenbosch: Jonkershoek, *Werner* (NBG); without precise locality, Stellenbosch Wild Flower Show (BOL 13753). Worcester: Du Toit's Peak, *Esterhuysen* 16061 (BOL, K, NBG, PRE, SAM), *Stokoe* (SAM 61324).

Four collections were cited under the var. *blommesteinii* when the species was described, three from the Caledon Wild Flower Shows of 1915 and 1920, with no precise locality, and the fourth from Elgin, collected by Van Blommestein after whom the species was named. As there is only a single flower of the last, and since no particular specimen was designated as the holotype, one of



FIG. 40. *G. blommesteinii*.

the collections from the Caledon Wild Flower Show, Bolus Herbarium no. 14786, has been selected as the lectotype. These plants are the only ones complete with corms.

Herbarium specimens with no corm attached bear a close resemblance to *G. ornatus* Klatt, with which they have sometimes been confused. They can easily be distinguished when the corm is present as it is larger than that of *G. ornatus*, and has hard woody tunics cut up into narrow sharply pointed teeth, not soft and papery as in *G. ornatus*. Even without corms the plants of *G. blommesteinii* can be distinguished by their usually having four instead of three leaves, and their bracts conspicuously lined with numerous closely set and slightly raised veins. The flowers have a faint and rather unpleasant scent similar to that of many species of *Homeria*.

72. **Gladiolus ornatus** Klatt in Trans. S. Afr. phil. Soc. **3** : 198 (1885); Dur. & Schinz, Consp. Fl. Afr. **5** : 222 (1893); N.E. Br. in J. Linn. Soc. **48** : 23 (1928); L. Bolus, Barclay & Steer, Second Book S. Afr. Flrs t.166 (1936); Lewis in Adamson & Salter, Fl. Cape Penins. 259 (1950); Kidd, Wild Flrs. Cape Penins. t.65 f.10 (1951). Type: Cape, flats near Rondebosch, MacOwan 2553 (SAM, holo.).

G. thunbergii Eckl., Top. Verz. 37 (1827), nom. nud. Type: Stellenbosch near Eerste River, Ludwig & Beil (S); non. F. G. Dietr. (1817). *G. inflatus* sensu Bak. in Fl. Cap. **6** : 147 (1896) excl. syn. *G. ringens* et *G. bullatus* Thunb.; non Thunb. (1800).

Common names: Pink Bell; Pypie.

Corm subglobose, 0,6–1,2 cm diam., with soft reddish brown membranous tunics, soon disintegrating. *Stem* slender, simple, 30–60 cm high, flexuose above middle, with 2 or 3 basal sheaths, the 1 or 2 outer hyaline or pale brown, truncate or obtuse, 0,5–7 cm long, inner 10–27 cm, acute or subacute, green, brown or purplish, faintly striate. *Leaves* 3, lowest with lower half sheathing, faintly striate, and a long slender blade overtopping the spike, subterete or linear with very prominent margins and midrib, 0,5–1,5 mm wide; 2 upper much shorter, the uppermost 3–10 cm long. *Spike* secund, lax, 1–4-flowered. *Bract* lanceolate or oblong-lanceolate, acuminate or acute, occasionally faintly striate, 2,5–5 cm long, usually about 3 cm; bracteole slightly shorter, acute or obscurely bidentate. *Flowers* fairly small, somewhat funnel-shaped or more open and campanulate, to inflated, usually prognathous, pale to deep pink with yellow hastate or diamond-shaped marks outlined in red on lower lobes. *Perianth tube* curved, 1,5–2 cm long, with upper half funnel-shaped or slender nearly to top then somewhat abruptly expanded; *lobes* obtuse or subacute, usually slightly undulate towards the apex, 2,5–3,5 cm long; 3 upper 1,3–2 cm wide, the laterals elliptic and dorsal slightly larger, obovate or broadly elliptic, somewhat hooded with apex porrect; 3 lower connate for 3–6 mm at base, spatulate or more or less elliptic, subequal or lowest slightly larger than

laterals, 0.8–1.5 cm wide. *Stamens* arcuate, arising 5–6 mm below top of tube and reaching middle of dorsal lobe; filaments 1–1.3 cm long; anthers linear, 0.9–1.2 cm long. *Ovary* ellipsoid, 5–7 mm long; style reaching about top of anthers, with spatulate conduplicate branches 4–5 mm long. *Capsule* ellipsoid, pale, thin-walled, 1.8–2 cm long; *seeds* broadly winged, suborbicular, about 7 mm long, yellow-brown.

Recorded from lower mountain slopes and plateaux around Cape Town, northwards to Piketberg and eastwards as far as Stellenbosch and Caledon occasional among Restionaceae, in heathy places or marshy reed flats, flowering August to October.

COLOUR PLATE 18. G. J. LEWIS.—1, flower spike; 2, corm and stem; 3, flower laid out; 4, stamen $\times 2$; 5, top of style $\times 2$; 6, flower front view; 7, bract; 8, bracteole.

Cape.—Cape Peninsula: near Smitswinkel Bay, *Lewis* 6105 (NBG). October 1962.

CAPE.—Caledon: near Hermanus, *Bolus* 9835 (BOL). Cape Peninsula: 29 km from Cape Town on Melkbosstrand road, *Lewis* 79 (SAM); Blouberg, *Marloth* 7471 (PRE); near Hout Bay, *MacOwan* HAA 285 (SAM); between Bakoven and Hout Bay, *Lindeberg* (S); near Camps Bay, *MacOwan* 2275 (SAM); foot of Table Mt., *Pappe* (SAM); near Cape Town, *Bolus* 3741 (BM, BOL, K, PRE); Cape Flats near Rondebosch, *MacOwan* 2553, (S, SAM), HAA 285 (BM, BOL, G, K, P, SAM, UPS); Flats at Claremont, *Dod* 2972 (BM, K); near Wynberg, *Schlechter* 1571 (Z); Constantia, *Jameson* (K); Constantiaberg, *Compton* 12117 (NBG); mountain above Tokai Forest, *Marais* (NBG); Noordhoek Mt., *Barker* 2355 (NBG); Fish Hoek, *Dod* 1429 (BM, BOL, K); Redhill, *Jameson* (K); Klawer valley, *Salter* 335/9 (BM); near Klaasjagers, *Barker* 5905 (BOL, NBG); between Klaasjagers and Smitswinkel, *Lewis* 6105 (NBG); Smitswinkel, *Hutchinson* 651 (K); Patrysvlei, *Salter* (SAM). Piketberg: near Piketberg, *Bolus* (BOL 27841). Somerset West: Helderberg, *Dummer* 603 (BM), *Exner* in herb. *Marloth* 10723 (PRE). Stellenbosch: near Eerste River, *Ludwig & Beil* in herb. Ecklon (S—type of *G. thunbergii* Eckl. MS.); *Garside* 1545 (K). Wynberg: Flats below Wynberg, *Kensit* (BOL 14766); Cape Flats near Doornhoogte, *Zeyher* 1629 (G, K, P, S); Cape Flats, *Moyle Rogers* (BM, K).

WITHOUT LOCALITY: *Pappe* (S); *Ecklon* (S); *Brehm* 180 (M).

Most of the heathy places on the flats where this attractive species used to be found have been built on, ploughed under or overrun by Australian wattles, and like so many others it is now fairly rare. It is surprising that there are no records from the Malmesbury/Hopefield districts where it must have been fairly plentiful in certain parts, and evidently is still in existence on one or two farms as it was on display at the Darling Wild Flower Show in September 1966. In this area the flower is more open and campanulate than on the Cape Peninsula.

In the *Flora Capensis* it was confused with *G. inflatus* Thunb. and the plant described by Baker under that name is *G. ornatus*, which he cited as a synonym. The error was pointed out by N. E. Brown in 1928, in the following note under *G. inflatus* Thunb. in his paper on the *South African Iridaceae* of Thunberg's Herbarium: 'For the plant described by Baker as *G. inflatus* (excluding Thunberg's specimen and *G. bullatus* Thunb., quoted as a synonym) the name *G. ornatus* Klatt may be taken. It is identical with some specimens wrongly placed under *G. hastatus* Thunb. by Baker, but whether it is identical with *G. thunbergii* Eckl. (placed as syn. of *G. hastatus* by Baker) I am unable to say, as there is no typical specimen of that species at Kew. If it is, then the latter name, being

the older, should be chosen' (*J. Linn. Soc.* 48 : 23).

There is a specimen in Ecklon's collection in the Stockholm Natural History Museum Herbarium named *G. thunbergii* Eckl., collected near Eerste River, on 27 September 1826, which presumably is the one collected by Ludwig and Beil on that date, cited by Ecklon in his *Topographisches Verzeichniss*, and in the South African Museum Herbarium there is one of Pappe's from the foot of Table Mountain with the same name. Both are identical with *G. ornatus* Klatt but Ecklon's name cannot be used for this species as not only is it a *nomen nudum* but also a later homonym of *G. thunbergii* F. G. Dietr. published in 1817 [= *Engysiphon exscapus* (Thunb.) Lewis]. Ecklon gave no description at all but cited three collections one of which, *G. communis* Thunb., is puzzling as the specimen so-named in Thunberg's Herbarium is the European *G. segetum* and quite unlike *G. ornatus*. Either Thunberg made a mistake when he recorded it from the Cape of Good Hope or else his plant came from one of the old Cape gardens.

It is not certain which plant Baker erroneously described as *G. hastatus* but it certainly was not *G. ornatus* for he described the corm as 2–2,5 cm in diam., with tunics of parallel strands of matted fibres, whereas those of *G. ornatus* are probably the smallest in the genus, usually less than 13 mm in diameter, and have soft papery tunics which often disintegrate at an early stage.

73. **Gladiolus gracilis** Jacq., Coll. 4 : 159 (1792) et Ic. t.246 (1795). Type: Jacq. Ic. t.246.

Common names: Sandpypie; Pypie.

Corm subglobose or ovoid, 1–2 cm diam., with dark brown lignified tunics cut up from below into regular narrow teeth. *Stem* very slender, simple, 20–75 cm high, usually 30–50 cm, flexuose near the top, sometimes remarkably so, with 2 obtuse basal sheaths (rarely 3), the outer hyaline or brownish, 1,5–5 cm long and inner up to 12 cm, brownish or green. *Leaves* 3–4, usually 4, the lowest long sheathing with a fairly short blade reaching below the spike or occasionally longer and overtopping it, linear, usually thickened or subterete with convolute projections from the margins more or less fused together above the midrib on both sides, often minutely scabridulous on the nerves, 1–2 mm wide, occasionally flat and up to 4 mm; upper leaves much shorter with short subulate or setaceous blades. *Spike* secund, lax, 1–8-flowered, usually 1–4. *Bract* lanceolate, acuminate or acute, with narrow hyaline margins, 2–4,5 cm long, usually about 3 cm; bracteole shorter than bract, minutely bidentate or bifid. *Flowers* smallish, funnel-form or bilabiate funnel-form with the lower lip projecting a little beyond the upper, pale blue, mauve-blue or pale pink with a band of cream or pale yellow streaked with fine purple broken lines and dots on lower lateral lobes, occasionally yellow and brown, rarely white, usually fragrant. *Perianth tube* curved, 1,4–1,7 cm long, funnel-shaped above the middle, very slender below; *lobes* acute or subobtusate, sometimes mucronu-





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late, the 3 upper subequal and all obovate or the laterals sometimes more or less oblong or elliptic, subungiculate and slightly smaller than dorsal, 2–3.5 cm long, 1–2 cm wide; 3 lower as long as upper or slightly longer, unguiculate, with slender claws connate for 5–8 mm, the laterals spathulate, 7–9 mm wide and lowest elliptic or more or less rhomboidal, 0.9–1.4 cm wide. *Stamens* arcuate, arising 5–6 mm below top of tube and reaching about middle of dorsal lobe; filaments 1.2–1.4 cm long; anthers linear, minutely apiculate, 0.7–1.2 cm long. *Ovary* ellipsoid, 3–5 mm long; style reaching about top of anthers, with oblanceolate or clavate conduplicate branches 2.5–3 mm long.

Widespread and fairly frequent in the south-western Cape on and around the Cape Peninsula, as far as Malmesbury in the west and Heidelberg in the east, on sandy flats and mountain slopes, among reeds and bushes; flowering from June to September, occasionally as early as May.

Two varieties are recognized.

KEY TO VARIETIES

Basal leaf linear, 1–2 mm wide usually thickened or subterete with convolute projections from the margins, often minutely scabridulous	(a) var. <i>gracilis</i>
Basal leaf 4–7 mm wide with flat winged projections on the margins, broadly H-shaped in section	(b) var. <i>latifolius</i>

(a) var. *gracilis*

G. gracilis Jacq., Coll. **4** : 159 (1792) et Ic. t.246 (1795); Willd., Sp. Pl. **1** : 211 (1798); Thunb., Prodr. 185 (1800); Fl. Cap. ed. Schult. 44 (1823); Ker in Curtis's bot. Mag. t.562 (1802), Gen. Irid. 138 (1827); Vahl, Enum. **2** : 82 (1806); Ait., Hort. Kew. ed. 2, **1** : 99 (1810); Poir. in Lam., Encycl. Suppl. **2** : 785 (1812); Red., Lil. t.425 (1814); Roem. & Schult., Mant. **1** : 290 (1822); Spreng., Syst. **1** : 151 (1825) excl. syn.; Eckl., Top. Verz. 37 (1827); Klatt in Linnaea **32** : 706 (1863); Bak., Handb. Irid. 203 (1892), Fl. Cap. **6** : 141 (1896) excl. syn. *G. laevis* et *G. elongatus*; Dur. & Schinz, Consp. Fl. Afr. **5** : 217 (1893) excl. syn. *G. laevis* et *G. lividus*; Marloth, Fl. S. Afr. **4**, t.46A (1915); L. Bol. in J. bot. Soc. S. Afr. **14** : 10, t.2 f.4 (1928), S. Afr. Gdng & Ctry Life **19** : 153 f.4 (1929); Lewis in Adamson & Salter, Fl. Cape Penins. 261 (1950); Kidd, Wild Flrs Cape Penins. t.45 f.3 (1950); Rice & Compton, Wild Flrs Cape of Good Hope t.212 f.1 (1951). Type: Cape, Jacquin Ic. t.246. *G. tristis* L. var., Jacq., Coll. **4** : 158 (1792) et Ic. t.244 (1795). *G. pterophyllus* Pers., Syn. **1** : 43 (1805). Type: Cape, Jacquin, Ic. t.244. *G. scaber* Spreng. & Link, Jahrb. **1**, **3** : 70 (1820); Roem. & Schult., Mant. **1** : 290 (1822). Type: Cape, herb. Willd. 923 (B, holo.). *G. setifolius* Eckl., Top. Verz. 37 (1827) nom. nud. Type: Caledon, Swartberg near spring, Ecklon & Zeyher (PRE 22361, iso.); non L.f. 1781. *G. spilanthus* Spreng. ex Klatt in Linnaea **32** : 711 (1863), pro parte, excl. syn. *G. carneus* sensu Andr. Type: Cape, Zeyher (K, holo.). ?*G. puniceus* Lam., Encycl. **2** : 727 (1786) nom. rej. ?*G. punctatus* var. *puniceus* Lam., Illustr. **1** : 117 (1791). ?*G. lamarckii* Roem. & Schult., Syst. **1** : 445 (1817) pro parte, nom. illeg.

The oldest name for this species is possibly *G. puniceus* Lam. but, as there is a strong element of doubt about this, it is rejected and Jacquin's name, which has been used by all botanists since it was published in 1790, is retained.

Lamarck described *G. puniceus* in 1786 in his *Encyclopédie Méthodique* but five years later, in his *Illustrations des Genres*, he cited it under another name, viz. *G. punctatus* β, *puniceus*, presumably intended as a variety of *G. punctatus* Lam. (not *G. punctatus* Jacq., which is *G. carinatus* Ait., published the previous year). On one of the sheets in his herbarium there are two labels one above the other, with the name *G. puniceus* Lam. dict. on one, and *G. punctatus* Lam. gen. on the other, and two specimens which belong to two different species, one of them *G. gracilis* and the other *G. maculatus* Sweet. The fairly detailed description of *G. puniceus* seems to apply to the former rather than the latter, except for the reference to the flower colour which Lamarck described as bright red, adding that the colour disappeared on drying, whereas in *G. gracilis* they are sometimes pink or a deep old rose shade but never bright red. In *G. maculatus* the flowers occasionally appear to be a deep red when they have a pink ground colour densely streaked and mottled with dark red, but more often they are various shades of dull yellow or brown streaked and mottled with dark brown or purple. Lamarck's very brief description of *G. punctatus* probably applies to *G. maculatus* but as there is another sheet of *G. gracilis* in his herbarium named *G. punctatus* this is open to doubt.

Under the description of *G. puniceus*, Lamarck stated that he had a variety with a tube longer than the spathe, and this specimen, on a separate sheet in his herbarium labelled 'Varietas *G. puniceae*, tubo spatha longiore', is the species now known as *G. monticola* Lewis, which is quite distinct from both *G. gracilis* and *G. maculatus*. There was no reference to this under the brief description of *G. punctatus* in 1791.

Lamarck cited two pre-Linnaean illustrations under *G. puniceus*, Plukenet's *Phytographia* t.187 f.4 of 1692 and Breynius's *Prodromus* t.12 f.1 of 1739, neither of which can definitely be identified as *G. gracilis*, in fact Breynius's illustration was referred by various authors to three other species, i.e. *G. angustus* L., *G. brevifolius* Jacq. and *G. villosus* Ker. Both Ker and Baker cited *G. puniceus* Lam. under *G. villosus* Ker (= *G. punctulatus* Schrank), but it definitely is not that species.

Since there is this uncertainty about the identity of *G. puniceus* and it is not possible to select one of the specimens in Lamarck's Herbarium as a satisfactory type, it is suggested that the name should be regarded as a *nomen confusum* and rejected.

In 1817 *G. puniceus* Lam. was renamed *G. lamarckii* by Roemer & Schultes in their *Systema Vegetabilium*, where they cited *G. puniceus* Lam. and also *G. puniceus* Vahl, but these are not the same, as the latter is based on *Ixia punicea* Jacq., a species of *Babiana*.

In Willdenow's Herbarium in Berlin there are two sheets of *G. gracilis*, no. 923 named *G. gracilis* and no. 926 named *G. recurvus* by Willdenow. The

former is the type of *G. scaber* Spreng. & Link which the authors distinguished from *G. gracilis* on account of the leaves being edged with delicate sharp-pointed hairs, but this is characteristic of *G. gracilis* in which the leaves are frequently slightly rough to the touch due to the edges of the margins and midrib being minutely scabridulous. Very often the outgrowths from the margins curve right over on both sides of the blade and are more or less fused together over the midrib, in which case the leaf may be smooth and subterete, but the rough edge is evident when there is a gap between the margins as in the plant figured by Ker in *Curtis's Botanical Magazine* in 1802 (t.562) where he described the leaves as follows: 'The leaves of this species have the appearance of being thick and flat, with a deep square groove on both sides, owing to the midrib being nearly obsolete and the marginal ones projecting far forward.' Occasionally the margins are only slightly raised and the leaf is more or less flat and wider than usual.

The plant figured by Jacquin as a variety of *G. tristis* on plate 244 of his *Icones* is almost certainly a form of *G. gracilis* with the lowest leaf longer than usual and overtopping the flower, which appears to be either faded or not fully open. It has been noticed in the field that poorly developed plants with a solitary flower sometimes have a longer leaf, as depicted by Jacquin. In 1805 Persoon named Jacquin's plant *G. pterophyllus*, and this name was cited by Baker in the *Flora Capensis* as a synonym of *G. gracilis*, but not Jacquin's figure. Thunberg cited Jacquin's figure under *G. elongatus* Thunb. (= *G. stellatus* Lewis) but it definitely is not that species, which has small regular or almost regular flowers with different colouring. It was no doubt due to Thunberg's misidentification that Baker placed *G. elongatus* Thunb. as another synonym of *G. gracilis*.

There are two records of an exceptionally small-flowered form in a small area near the coast in the Bredasdorp district, the whole flower, including the ovary, about 2 cm long and described as pale purplish blue or bluish towards edges of the lobes, brownish purple in middle or brownish in the throat. In colouring and size this flower resembles the one figured by Jacquin on plate 244. In other parts of the Bredasdorp district there is a yellow and brown colour form which is not known to occur in any other district and differs from the typical only in the colour of the flower.

COLOUR PLATE 19. G. J. LEWIS.—1, inflorescence; 2, corm; 3, transverse section of leaf $\times 4$; 4, flower front view; 5, longitudinal section of flower; 6, bract; 7, bracteole.

Capec.—Caledon: near Hermanus, *Lewis* 6088 (NBG). September 1964.

CAPE.—Bellville: Mamre road, 37 km from Cape Town, *Barker* 4093 (NBG); Tygerberg, *Ecklon* (S); E. of Melkbosstrand, near Darling road, *Acocks* 4732 (S); Durbanville, *Taylor* 4933 (NBG, PRE); between Durbanville and Paarl, *Lewis* (BOL). Bredasdorp: Dirkie Uys Kraal, *Van Breda* 924 (K, PRE); Ratel River, *Barker* 2483 (BOL, NBG); Frikkie Bay, *Compton* 18182 (NBG); Bredasdorp, *Compton* 9015 (NBG); between Bredasdorp and Struis Bay, *Esterhuysen* 2632 (BOL, PRE); between Bredasdorp and Cape Agulhas, *Esterhuysen* (SAM); near Struis Bay, *Retief* (NBG); 'Nachtwacht', Jantjesbos, *Smith* 2986 (BOL, PRE), 3077 (PRE) dwarf form. Caledon: Between Sir Lowry's Pass and Caledon, *Barker* 53 (K); Houhoek, *Bowie* 20 (BM), Lebanon, Elgin, *Botha* (NBG); Hottentots-Holland, *Zeyher*

117 (S); Caledon, *Zeyher* (K); Swartberg, near spring, *Ecklon & Zeyher* s.n. (BR, C, L, LD, P, PRE, UPS, Z—named *G. setifolius* Eckl.), 142 (G, LD); Klein River Mts, *Zeyher* 3986 (G, K, S, Z), *Stokoe* 6195 (BOL); Babylon's Tower, *Zeyher* (C); near Hermanus, *Bolus* 9834 (BOL); Hermanus, *Lewis* 6088 (NBG); Franskraal, Danger Point Mt., *Leighton* 1901 (BOL). Cape: Blouberg road, *Barker* 455 (NBG). Cape Peninsula: Little Lion's Head, *Barker* 184 (BOL, NBG); Hout Bay, *Compton* 9152 (NBG); Hout Bay Nek, *Gamble* 22228 (K); near Camps Bay, *MacOwan* K/5 (S, SAM), 2275, HAA 281 (BM, BOL, G, K, P, SAM, UPS), *Thode* A163 (PRE), *Marloth* 119 (PRE), *Cassidy* 194 (NBG), *Moss* 11511 (BM); between Sea Point and Kloof Nek, *Wilms* 3693 (AMD, BM, G, L, P); Table Mt., *Gamble* 22051 (K), *Prior* (K, Z), *Moyle Rogers* (K), *Verreaux* (G), *Ecklon* (S), *Acocks* 2790 (S); W. slopes of Table Mt., *Esterhuysen* 15440 (BOL, NBG); Table Mt. and Devil's Peak, *Drège* (S); Devil's Peak, *Bolus* 4024 (BOL, K); Lion's Head, *Lindeberg* (S), *Pappe* (S, SAM), *Ecklon* (S—named *G. setifolius* Eckl.); near Cape Town, *Prior* (BM), *Rehmann* 1434 (BR), 1437 (Z), *Brehm* (BR); Spanschetraviers, Constantia, *Zeyher* 308 (SAM); Fish Hoek flats, *Salter* 7403 (SAM); Glencairn, *Salter* 334/13 (BM, K); Slangkop (Kommetjie), *Compton* 18021 (NBG); near Simonstown, *Jameson* (K), *Pappe* (BM, K), *Ecklon & Zeyher* s.n. (C, L, P, PRE, UPS, Z), 151 (G, LD, SAM). Heidelberg, near Heidelberg, *Barker* 6094 (NBG). Malmesbury: Moorreesburg, *Esterhuysen* 5532 (BOL); Malmesbury, *Compton* 10923 (NBG); Darling, *Bachmann* 523 (Z); Paardeberg, *Pillans* (BOL); Mamre, *Stokoe* (SAM 59744). Stellenbosch: Bottelary, *Acocks* 457, 620, 2455 (S). Swellendam: Swellendam, *Bowie* 23 (BM), *Fry* in herb. Galpin 4995 (GRA, PRE). Wynberg: Cape Flats, *Moyle Rogers* (BM), *Schinz* (Z), *Rogers* 27209 (Z), *Zeyher* 50 (S), *Strey* 563 (PRE); flats near Doornhoogte, *Dod* 587 (BM, K), *Zeyher* 3986 (P).

WITHOUT LOCALITY: *Burman* (G); *Drège* (G); *Harvey* 64 (BM); *Kolbing* (G); *Krauss* 1403 (G); *Sonnerat* (P, —*G. puniceus* & *G. punctatus* in herb. Lamarck); *Masson* (BM); *Mund* (K); *Oldenburg* 252 (BM); *Osbeck* (S); *Pappe* (K); *Prior* (K, PRE); *Roxburgh* 4 (BM); *Schlechtendahl* (G); *Sieber* 32 (L, LD, S), 132 (S), 133 (BR, G, L, LE, P); *Sparman* 46 (LINN, sheet 59.10); *Thunberg* (G, LD, S, UPS—sheet 1028 in herb. Thunb.); *Verreaux* (C.P.); *Villet* (K); herb. *Willdenow* 923, (B); *Zeyher* (K—*G. spilanthus* Spreng. MS).

(*b*) var. **latifolius** Lewis, var. nov., a var. typica folio latiore 4–7 mm lato, H-formi in sectione transversali, floribus tubo aliquantum brevioribus 1–1,4 cm longis, lobis magis rotundatis et lateralibus inferioribus conspicue violaceo maculosis differt.

Type var.: Cape, Hopefield district, Donkergat road N. of Churchhaven, *Barker* 10395 (NBG, holo.).

Differs from var. *gracilis* in having wider leaves, the lowest 4–7 mm wide, with flat winged projections on the margins, broadly H-shaped in section, and flowers with a slightly shorter tube, 1–1,4 cm long, the lobes more rounded and lower laterals with more numerous conspicuous purple dots.

Very local among bushes in sandy soil near the coast in the Hopefield district, flowering July–August.

CAPE.—Hopefield: Donkergat road, N. of Churchhaven, *Barker* 10395 (NBG); Danger Bay, near Saldanha Bay, *Leighton* 1721 (BOL, NBG, SAM); near Vredenburg, *Thomas* (NBG).

This distinct variety, confined to a small area in the vicinity of Saldanha Bay, is distinguished by its wider leaves, the lowest broadly H-shaped in section but appearing flat when dried due to the flattening of the winged projections of the margins. These grow at a right angle to the blade instead of curved over as in var. *gracilis*, and are usually smooth on the edges, only occasionally minutely scabridulous. The flowers are faintly scented and the same pale blue or mauve-blue colour as the more common form of var. *gracilis* with the lower lateral lobes partly creamy-yellow but more densely and conspicuously dotted with purple.

74. **Gladiolus exilis** Lewis, sp. nov., *G. gracili* affinis sed tunicis mollibus submembranaceis scapo erecto folio applanato lineari et floribus pallide lilacinis lobis ellipticis longe attenuatis differt.

Cormus ovoideus vel subglobosus 1,5–2 cm diam. tunicis brunneis submembranaceis in collum ad 3 cm longum productum. *Folia* 3 longe vaginantia, laminis liberis brevibus. *Spica* ad 75 cm longa (1–) 2–5-flora. *Bracteae* lanceolatae 2–3,5 cm longae, acutae vel acuminatae. *Flores* parvi 5 cm longi bilabiati pallide coerulei vel lilacini; lobi inferiores lateriores pallide flavi lilacinomaculati.

Type: Cape, Wellington district, near top of Bain's Kloof on Wellington side, *T. T. Barnard* s.n. (NBG 62038, hol.).

Corm ovoid or subglobose, 1,4–2 cm diam., with soft brown or reddish brown tunics more or less connate and submembranous above the base and extending up in a thin uneven neck up to 3 cm long. *Stem* slender, simple, 38–75 cm long, straight or subflexuose near the top, with 2 or 3 basal sheaths, the 1–2 outer obtuse, hyaline, 1,5–7 cm long and inner up to 16 cm, acute or subacute, green or greyish, often brown at the apex. *Leaf* of non-flowering plant linear, 65 cm long, 1 mm wide, glabrous, margins and midrib prominent below; cauline leaves 3, long-sheathing and greyish, often brown at the apex; *leaves* 3, long-sheathing and enclosing the stem nearly to the spike, the blades short, linear or subulate, up to 7 cm long, 1–1,5 mm wide, with slightly prominent margins and midrib, the lowest reaching above the middle of the stem and uppermost 3,5–10,5 cm long. *Spike* secund, 2–5-flowered (rarely 1). *Bract* lanceolate, acute or acuminate, 3,5–2 cm long; bracteole slightly shorter and usually bidentate. *Flowers* small, bilabiate, the lower lip projecting beyond the upper, slightly fragrant, pale blue, mauve or white tinged with pale mauve, the lower lateral lobes pale yellow with mauve flecks on the lower half. *Perianth tube* curved, funnel-shaped, 1,2–1,5 cm long; *lobes* with undulate margins, obtuse to acute, the 3 upper elliptic or obovate-elliptic, the dorsal 2,3–3,5 cm long, 1,1–1,8 cm wide and laterals slightly smaller; 3 lower subequal, elliptic or more or less oblong and tapering to the base, 2,5–3,5 cm long, connate for 4–5 mm, 0,7–1 cm wide. *Stamens* arcuate, arising 4–5 mm below top of tube, reaching nearly to middle of dorsal lobe; filaments about 1,2 cm long; anthers linear, subsagittate, shortly apiculate, 0,8–1 cm long. *Ovary* ellipsoid, 3–5 mm long; style reaching nearly to top of anthers, the branches 3 mm long, spatulate or suborbicular-spatulate, conduplicate. *Capsule* more or less ellipsoid, 1,2–1,5 cm long, pale, fairly firm-walled; *seeds* yellow-brown, broadly winged, suborbicular or oblong-orbicular, 5–6 mm long.

Recorded from the Wellington, Worcester and Ceres districts of the Cape where it is occasional on rocky mountain slopes at 700–1 300 m alt., flowering April to May.

CAPE.—Ceres: Michell's Pass, *Compton* 10828 (NBG), *Esterhuysen* 5135 (BOL); Inkruip, Witsenberg, *Esterhuysen* 25767 (BOL). Wellington: near top of Bain's Kloof on Wellington side, *T. T. Barnard* (NBG 62038); Bain's Kloof, *L. Taylor* 346 (BOL). Worcester: Bain's Kloof, *Stephenson* (STE 8967),

Bain's Kloof, Worcester side, *Loubser* 2015 (NBG), *Barker* 3807 (NBG—in fruit); Molenaarsberg, Dutoitskloof, *Esterhuysen* 16953 (BOL, PRE); Badsberg, S.W. slopes above Slanghoek Ko-op. Wynkelders, *Taylor* 4817 (NBG).

This slender autumn-flowering species is allied to *G. gracilis*, but differs in having much softer submembranous corm tunics, a straighter stem, flat linear leaf blades and paler flowers with more tapering elliptic lobes and shorter stamens.

It flowers at the same time as the small autumn-flowering species in the group with basal leaves produced after the flowering period and closely resembles *G. vaginatus* but is distinguished by having short free blades to the closely sheathing leaves, and does not appear to produce a separate basal leaf after flowering. In Miss Esterhuysen's collection from the Witsenberg area one of the corms bears a flowering shoot and the dead remains of three previous ones but there is no trace of a basal leaf.

Two corms from the type collection, planted at the Compton Herbarium for observation, did not produce a leaf after flowering but in May the following year, the normal flowering time, a single linear leaf, about 65 cm long, glabrous and about 1 mm wide with the margins and midrib very prominent in the lower half, was produced by each corm. These probably did not arise from the parent corms but from young cormlets produced by them, as happens in many species.

75. *Gladiolus mutabilis* Lewis, nom. nov. *G. muirii* L. Bol. in Ann. Bolus Herb. **3** : 181 (1924), non L. Bolus 1915. Type: Cape, Riversdale district, *Muir* 1412 (BOL, lecto.).

Common name: Brownies (Port Elizabeth).

Corm usually somewhat elongated, narrowly pyriform or ovoid, up to 4 cm long, 1,2–2 cm diam., the tunics pale brown, soft, sometimes matted, cut up from the base into numerous fine segments, more or less connate above the middle, extending up in a fibrous neck 2–6 cm long. *Stem* simple, very slender, fairly rigid, 20–60 cm high, usually 30–40 cm, with 2 basal sheaths, the outer brownish or pallid, 2–5 cm long, inner up to 15 cm, green, greyish or purplish. *Leaves* 4, long-sheathing, with very short to fairly long linear blades, the lowest sometimes reaching to base of spike but usually shorter, 1–1,5 mm wide, firm, 2–3-nerved, the upper much shorter, subulate or acicular. *Spike* short, second, 1–3-flowered. *Bract* lanceolate or oblong-lanceolate, acuminate or acute, 2,5–4,5 cm long; bracteole slightly smaller than bract, usually minutely bidentate. *Flowers* small, funnel-form, fragrant, varying from greyish purple to greyish mauve, pale or pinkish mauve, cream and brown, pale yellow or golden yellow and brown, the lower part of lower lobes pale yellow with fine purplish lines running down to the base. *Perianth tube* curved, funnel-shaped, 1,3–1,5 cm long; *lobes* obtuse or subacute; 3 upper obovate, the dorsal hooded, 2,8–3,2 cm long, 1,4–1,7 cm wide, slightly larger than the laterals; 3 lower subunguiculate, connate for 0,5–1 cm at base, about as long as upper, the laterals more or less spatulate, 0,7–1 cm wide and lowest larger, broadly elliptic or subrhomboidal,



FIG. 41. *G. mutabilis*.

1–1,4 cm wide. *Stamens* arcuate, arising 4–5 mm below top of tube and reaching middle of dorsal lobe or shortly above; filaments 1,2–1,4 cm long; anthers linear, subsagittate, 0,9–1,2 cm long. *Ovary* oblong or ellipsoid, 3–5 mm long; style reaching shortly above or below top of anthers, with spatulate or oblanceolate conduplicate branches 3–4 mm long.

The species inhabits low-lying hillslopes in the south-eastern Cape coastal districts from Riversdale to Albany and flowers during July and August.

FIG. 41. From a painting by G. J. Lewis.—Top of inflorescence and leaf; horizontally elongated corm and base of stem; flower full face; bract and bracteole; flower laid out.

Cape.—Riversdale, road to Gouritz River mouth *Thomas* (70744 NBG) ex hort. Kirstenbosch. July 1963.

CAPE.—Albany: Longford Grange, S. slopes of Witteberg, *Martin* (RUH 9275) without precise locality, *Britten*, Bot. Survey 2935 (BOL). George: Waboomskraal, near top of Outeniqua Pass, *Lewis* 4441 (SAM). Humansdorp: Kareedouw Pass, *Gillett* 2021 (K); Humansdorp, *Rogers* 2878 (PRE), *Wagner* (STE 16847); Assegaibos, *Fourcade* 5370 (BOL, SAM); between Humansdorp and Kruisfontein, *Fourcade* 4584 (BOL). Port Elizabeth: Swartkops, *Ecklon & Zeyher* 145 (P); Parsons Vlei, *Long* 3 (BOL), 244 (GRA, K, PRE); Port Elizabeth, *Paterson* 688 (BOL, GRA, K), *Moorshead* (K), *Hallack* in herb. Galpin 3009 (PRE), *Batten* (NBG); Redhouse, *Paterson* NBG 1162/29 (BOL), Bethelsdorp, *Denman* 255 (GRA). Riversdale: Soetmelksfontein, hills above Kafferkuils River, *Bartlett* in herb. Muir 2552 (BOL, K); Magermanskraal, *Muir* in herb. Rogers 16761 (Z); about 11 km from Albertinia on Mossel Bay road, *Van Breda* 904, 1144 (PRE); road to Gouritz River mouth, 1,5 km S. of National Road, *Thomas* (NBG); without precise locality, *Muir* 1412 (BOL). Uitenhage: Uitenhage, *Harvey* 829 (BM, K); 24 km up Elands River road, *Acocks* 21268 (K, NBG, PRE). Uniondale: Joubertina, Bruinklip, *Van Breda* 553 (PRE).

The late Dr John Muir, in whose honour this species was originally named, devoted most of his spare time to studying the plant life of the district in which he practised, and is well known for his papers, 'The Vegetation of the Riversdale Area' and 'The Seed-drift of South Africa', published in the *Botanical Survey Memoirs*. It is unfortunate that he can no longer be commemorated by a species in this genus, but as his name had previously been given to another species in 1915—later found to be the same as *G. involutus* De la Roche—it should not have been used for this one, which is now renamed *G. mutabilis* to denote the changes which occur in the colouring of the flowers. In the Riversdale and other districts eastwards to Port Elizabeth they are usually in various shades of purple, mauve or pinkish mauve, with yellow on the lower lobes, but around Port Elizabeth, where they are commonly known as 'Brownies', the colours range from cream shaded with brown to pale yellow or rich golden yellow and brown.

Two collections were cited when the species was described and the first, *Muir* 1412, is now selected as the lectotype. Louisa Bolus considered it to be very closely allied to *G. carinatus* Ait. (erroneously known as *G. recurvus* L. at that time) but differing in the shape of the corm, the rather rigid 'restioid' stem, the unspotted basal sheaths and the different scent of the flowers. It could more easily be confused with *G. gracilis* Jacq., to which it is more nearly allied but distinguished by the different shape of the corm and its much softer tunics, and the structure of its narrow leaves in which the margins are not

prominently raised and involute as in *G. gracilis*. Moreover it occurs further east.

76. *Gladiolus violaceo-lineatus* Lewis, sp. nov., *G. gracili* affinis sed cormo aliquantum lignoso folio basali plerumque tri-alato et perianthii lobis longe attenuatis et reflexis violaceo-lineatis differt.

Cormus ovoideus c. 1,5 cm diam. tunicis brunneis aliquantum lignosis et unguiculatis. *Folia* 4 vel rarius 5, folium basale ad 55 cm longum scapum amplexans, lamina libera 3-alata costa media dorsali prominenti. *Spica* gracilis simplex ad apicem flexuosa 35–65 cm longa 1–3 flora raro 4–5. *Bracteae* lanceolatae 3–5 cm longae margine hyalina. *Flores* parvi c. 5 cm longi bilabiati, lilacini violaceo-lineati, lobis inferioribus ad basin pallide flavis.

Type: Cape. Clanwilliam district, Alpha, western slope, *Lewis* 6142 (NBG, holo.).

Corm ovoid, 1,2–1,8 cm diam., with tunics of brown firm, sometimes somewhat lignified fibres, more or less connate and slit up from the base into short acuminate teeth. *Stem* slender, simple, flexuose near the top, 35–65 cm long, with 2 or 3 sheaths at the base, the 1–2 outer hyaline, obtuse, 1,5–8,5 cm long, and inner acute or subacute, 7–15 cm long, green or purplish green, rarely green and purple mottled. *Leaves* 4, rarely 5, the lowest 24–55 cm long, usually $\frac{3}{4}$ or more sheathing, with a short linear blade 0,5–2 mm wide (rarely to 4 mm), nearly always 3-winged due to a blade-like projection from the midrib on one side only; upper leaves shorter with subulate-setaceous blades, the uppermost 4–8 cm long, half sheathing. *Spike* secund, 1–3-flowered, rarely 4 or 5. *Bract* lanceolate, oblong-lanceolate or occasionally linear-oblong, acuminate or acute, 3–5 cm long, with narrow hyaline margins; bracteole similar to bract but shorter and usually bidentate. *Flowers* fairly small, short-tubed, somewhat funnel-shaped with tapering lobes reflexed near the middle, pale mauve, bluish or greyish mauve marked with violet plumose veins on upper half of lobes and broken lines in lower half, the lower half of 3 lower lobes pale yellow. *Perianth tube* curved, funnel-shaped, 1,2–1,4 cm long; *lobes* acuminate, the dorsal ovate-lanceolate, slightly hooded in the lower half, 3,2–3,8 cm long, 0,9–1,8 cm wide; others lanceolate, the upper laterals 3–3,5 cm long, 0,9–1,2 cm wide, and 3 lower subequal 2,7–3,5 cm long, 6–9 mm wide, connate for 6–7 mm. *Stamens* arcuate, arising 4–5 mm below top of tube; filaments 1,2–1,4 cm long; anthers linear, minutely apiculate, 0,8–1,1 cm long. *Ovary* oblong or ellipsoid, 4–5 mm long; style reaching to top or nearly to top of anthers, with oblanceolate conduplicate branches 4–5 mm long.

A rare species confined to the Clanwilliam and Vanrhynsdorp districts in the western Cape where it is occasional among rocks and bushes on the western mountain slopes from 330–3 000 m, flowering from July to August.

CAPE.—Clanwilliam: Pakhuis, *Esterhuysen* 5920 (BOL); Clanwilliam, *Esterhuysen* 5542 (BOL); Nieuwoudt Pass, *Martin* NBG 1266/37 (BOL), NBG, *Horrocks* 94 (NBG); Alpha, western mountain slope,



FIG. 42. *G. violaceo-lineatus*.

Lewis 6142 (NBG), *Bond* 1050 (NBG); Elandskloof, *Stokoe* (SAM 68333). Vandrhyndorp: between Gifberg and Matjekamma, *Leipoldt* 4067 (BOL).

FIG. 42. From a painting by G. J. Lewis.—Inflorescence; corm, stem and basal leaf; flower front view; bract and bracteole; flower laid out.

Cape.—Clanwilliam, Alpha Farm, *Lewis* 6142 (NBG). July 1963.

Like *G. comptonii*, this also flowers during the winter, and occurs in much the same area but has a somewhat wider distribution. The shape of the flower, with its tapering reflexed lobes, is similar to that of *G. comptonii*, but apart from the very marked difference in the colouring *G. violaceo-lineatus* is distinguished by the shape of its corm and texture of the tunics, and by the three-winged blade of the lower leaf. This character is most unusual and has not been observed in any other species. In a few species the midrib is conspicuously raised on both sides of the blade so that in transverse section the leaf is more or less cruciform but in this one there is a distinct wing-like outgrowth, similar to half of the leaf blade, on one side only. This structure is not easy to see when the leaf is flattened in the process of drying.

77. ***Gladiolus comptonii*** Lewis, sp. nov., *G. blommesteinii* affinis sed cormi tunicis mollibus in collum 2–8 cm longum attenuatis, bracteis longioribus floribus flavis lobis reflexis differt.

Cormus ovoideo-globosus, 1,3–2 cm diam. tunicis rubro-brunneis fibrosis mollibus in collum 2–8 cm longum attenuatis. *Folium* basale 40–60 cm longum ad medium vaginans minute hispidulum lineare vel subulatum; folia superiora 3 similia sed minora. *Spica* ad 75 cm alta gracilis 1–2–3-flora. *Bracteae* lanceolatae 4–7 longae margine hyalina. *Flores* aliquantum parvae; tubus brevis; lobi ad medium reflexi vivide flavi, lobi inferiores rubro-brunneo striati.

Type: Cape, Vandrhyndorp district, Heerenlogementberg, *Lewis* 6144 (NBG, holotype).

Corm ovoid-globose, 1,3–2 cm diam., with dark reddish brown tunics of fine vertical more or less connate fibres extending up in a thin sheath-like neck 2–8 cm long. *Stem* slender, simple, flexuose, 42–75 cm high, average 45–60 cm, with 2 sheaths at the base, the outer submembranous, obtuse or subobtuse, yellowish or orange, sometimes brown at the apex, 6–12 cm long, the inner acute or subacute, usually purplish, minutely hispidulous, 13–19 cm long. *Leaves* 4, the lowest usually 40–60 cm long, half or more sheathing, faintly striate and minutely hispidulous, the blade linear or subulate, 1,5–4 mm wide, with slightly prominent margins and midrib, sometimes minutely scabridulous on the nerves; upper leaves similar to lowest but shorter, the uppermost 6,5–10,5 cm long, with shorter subulate-setaceous blades. *Spike* secund, 1–2 or occasionally 3-flowered. *Bract* lanceolate, 7–4 cm long, with narrow hyaline margins; bracteole similar to bract but shorter and minutely bidentate or bicuspidate. *Flowers* fairly small, short-tubed, somewhat funnel-shaped with

tapering lobes reflexed near the middle, bright yellow with fine reddish brown streaks and flecks on lower half of lobes and in the throat. *Perianth tube* curved, funnel-shaped, 1–1.4 cm long; *lobes* lanceolate, ovate-lanceolate or occasionally more or less elliptic, acuminate or acute, the dorsal 3.6–4.6 cm long, 1.2–1.7 cm wide, with the lower half hooded; other 5 slightly smaller, the 3 lower connate for 2–4 mm, the laterals 0.8–1 cm wide and lowest slightly wider. *Stamens* arcuate, arising 3–4 mm below top of tube; filaments 1.2–1.4 cm long; anthers linear, subsagittate, 0.9–1 cm long. *Ovary* oblong or ellipsoid, 4–6 mm long; style reaching to top or nearly to top of anthers, with oblanceolate conduplicate branches 4–6 mm long.

Endemic in the Vanrhynsdorp district, western Cape, on Heerenlogementberg at about 700 m altitude, local among rocks and bushes, flowering in July.

COLOUR PLATE 20. G. J. LEWIS.—Corm and base of stem; flower spike; bracteole, bract; flower laid out.

Cape.—Clanwilliam: Heerenlogementberg. Type site. *Lewis* 6144 (NBG). July 1963.

CAPE.—Vanrhynsdorp: Heerenlogementberg, *Compton* 10965 (NBG), *Esterhuysen* 5560 (BOL), *Lewis* 6144 (NBG).

This attractive species appears to be restricted to a small area on an isolated mountain about 29 km from the coast in the Vanrhynsdorp district, where it occurs only on the western ridge near the summit. It was first collected there by Professor Compton and Miss Esterhuysen in July 1941, and was not collected again until July 1963 when Lewis visited the area and brought back living plants from which the accompanying plate was prepared. Although various mountains near by in the Vanrhynsdorp and adjoining parts of the Clanwillaim districts have been explored at the same time of the year this species has not been found in any other locality.

78. **Gladiolus inflatus** Thunb., Prodr. 185 (1800). Type: Cape, *Thunberg* 1033 (UPS, holo.). (See fig. 43.)

Common name: Tulbagh Bell.

Corm ovoid or globose when young, 1–3 cm in diam., densely covered with coarse hard dark woody tunics cut up into short acuminate teeth, the old tunics persisting below to form a cylindrical body with age, forming a fibrous dark neck above. *Stem* slender, simple, straight or curved outwards below the spike, 25–60 cm high; with 1 or 2 basal sheaths, the outer membranous, brownish, 3–15 cm long, inner 1–3 cm longer, firm, grey-green or brown. *Leaves* 3, the lowest sheathing below, reaching from middle to top of spike or shortly above it, subterete, 0.5–1 mm in diam., glabrous or minutely hispidulous near the base, apex spinescent; second shorter or slightly longer than lowest with a much longer sheath and shorter blade; uppermost 1–10 cm long, with or without a short subulate blade. *Spike* 1–6-flowered, usually 2–4, second



Gleditsia inflata, Thunb.

dorm. c. 1800

10/1/20

Gleditsia inflata Thunb.
not of Baker
G. Polakii, Baker
Determinavit
W. E. Brown

Gleditsia inflata, Thunb.
det. Whit.

Gleditsia inflata, Thunb.

S. Hoffm. m.

FIG. 43. Type of *G. inflatus* Thunb. (sheet 1033, herb. Thunb. UPS).

Photo: By courtesy of University of Uppsala.

with the flowers close together. *Bracts* navicular, more or less inflated, obtuse or acute, grey-green, usually with narrow hyaline margins and faintly striate, 1,5–2,5 cm long, occasionally up to 3,5 cm; inner slightly shorter, minutely bidentate. *Flowers* small, 3,5–5,5 cm long, spreading horizontally or slightly cernuous inflated-campanulate with the dorsal lobe somewhat hooded and projecting forward and the lower lip equally long (in one form the perianth is narrowly funnel-shaped, fairly regular and semi-erect), pale to deep pink or pinkish mauve to deep mauve-blue, slate grey or rarely whitish, usually with a yellow or cream, hastate or diamond-shaped mark outlined with wine red or purple on lowest lobe; the markings on lower laterals varying from a small arrow-head with dark outline to a small dark patch or irregular transverse band or reduced to a yellow spot or wanting. *Perianth tube* 0,9–2(–2,5) cm long, somewhat abruptly curved near middle and funnel-shaped above in typical short-tubed form, in form with longer tube curved near top and straight and cylindrical below; *lobes* unequal, the dorsal largest, obovate or orbicular-obovate, obtuse, sometimes subacute, 2–3 cm long, 1,5–2,5 cm wide; upper laterals more or less rhomboidal or elliptic, acute or subobtuse, 1,8–2,5 cm long, 1–1,8 cm wide; 3 lower about equal in length and as long as dorsal, connate for 4–7 mm, the laterals spatulate or obovate-spatulate, obtuse or subobtuse, occasionally acute, 0,8–1,5 cm wide near top, lowest elliptic, acute or subacute, 0,9–1,4 cm wide near middle. *Stamens* arcuate, arising 5–6 mm below top of tube and reaching about middle of dorsal lobe; filaments 1,3–1,6 cm long; anthers linear, 5–8 mm long. *Ovary* oblong or rotund, 3–6 mm long; style reaching from shortly above base to top of anthers, with spatulate more or less retuse conduplicate branches 3,5–5 mm long.

A montane species widespread in the south-western and western Cape from Clanwilliam to Tulbagh and Caledon, occasional among rocks on mountain slopes and plateaux up to 3 000 m, flowering from August to November. The subspecies *intermedius* occurs further east, from Montagu to Willowmore, flowering later, September to December, rarely August.

From a survey of the ample material now found in South African herbaria, the Tulbagh Bell appears to be a variable, fairly widespread species. Here too, the perianth apparently possesses an unstable pattern and may produce a long tube and fairly regular limb (probably an ancestral trait) or show a short bent tube and zygomorphic limb; it may also vary in size and colour. The race found further to the east with somewhat larger flowers has been placed in the subspecies *intermedius* for it approaches *G. rogersii*. The variety *louiseae* can be recognized by the small upper bract (reduced leaf) which has no free blade.

Two subspecies and, in ssp. *inflatus*, two varieties, are recognized.

KEY TO SUBSPECIES AND VARIETIES

Perianth pink, about 2–3 cm long, somewhat closed; tube short and curved to about as long as the limb and then fairly straight; inland mountainous region around Tulbagh, Ceres, Worcester and Clanwilliam

(a) ssp. *inflatus*

Uppermost bract-like leaf similar to but smaller than one below it, with a free acute apex	(α) var. <i>inflatus</i>
Uppermost bract-like leaf much smaller and completely sheathing the scape with an acute apex	(β) var. <i>louisiae</i>
Perianth grey-mauve to blue, about 2-4 cm long, gaping; tube short and curved; found further east from Prince Albert to Willowmore along the Langeberg	(b) ssp. <i>intermedius</i>

(a) ssp. **inflatus** var. (α) **inflatus**

G. inflatus Thunb., Prodr. 185 (1800), Fl. Cap. **1** : 181 (1811), ed. Schultes 43 (1823); Vahl, Enum. **2** : 87 (1806); Roem. & Schult., Syst. Veg. **1** : 415 (1817); Ker, Irid. Gen. 138 (1827); N.E. Br. in J. Linn. Soc. **48** : 23 (1928); Rice & Compton, Wild Flrs Cape Good Hope t.204 f.2 (1951). Type: Cape, *Thunberg* 1033 (UPS, holo., PRE, photo.). *G. tristis* vars m and n Thunb., Diss. Glad. 12 (1784).

G. hastatus Thunb., Prodr. 185 (1800); Fl. Cap. **1** : 181 (1811), ed. Schultes 43 (1823) excl. syn. *G. angustus* sensu Jacq.; Vahl, Enum. **2** : 86 (excl. syn.); N.E. Br. in J. Linn. Soc. **48** : 22 (1928). *G. tristis* var. 0, Thunb., Diss. Glad. 12 (1784). Type: Cape, *Thunberg* 1032 (UPS, holo.). *G. bolusii* Bak. in Handb. Irid. 208 (1892), Fl. Cap. **6** : 145 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 214 (1893); L. Bolus, Barclay & Steer, First Book S. Afr. Flrs t.129 (1928). Type: Cape, Winterhoek near Tulbagh, *Bolus* 5244 (K, holo., BM, BOL). *G. taubertianus* Schltr in Bot. Jahrb. **27** : 103 (1900). Type: Cape, Ceres dist., Cold Bokkeveld, *Schlechter* 8860 (Z, holo., B, BM, BOL, G, GRO, PRE).

There has been considerable confusion in the past about this species, which for many years was known as *G. bolusii* and was illustrated under that name in 1928 in L. Bolus, Barclay and Steer's *First Book of South African Flowers*. It was first collected by Thunberg on his travels in this country between 1772 and 1775 and originally listed by him as one of many varieties of *G. tristis* in his account of the genus in 1784, but in 1800 he named it *G. inflatus* and published a fairly detailed description in his *Prodromus Plantarum Capensium*. The specimens on the two sheets so-named in his herbarium are unlocalized but almost certainly come from different localities as they represent two forms of this very variable species, the flowers of one being larger and with more rounded lobes than the other. In his account of the *South African Iridaceae* of Thunberg's Herbarium, N. E. Brown made the following comments on this species:

"Two sheets, both *G. inflatus* Thunb., synonym *G. bolusii* Baker (1892). Upon comparing Thunberg's type with the Kew material, I find that Baker has misidentified it with a different species incorrectly described as *G. inflatus* in his *Handbook of Irideae* and the *Flora Capensis*. The real *G. inflatus* he described is a new species under the name *G. bolusii*. Therefore the nomenclature of this species should stand as given above. I think that probably *G. taubertianus* Schltr. (1900) also should be added as a synonym of *G. inflatus* Thunb. as it appears to be the same species but with rather smaller bracts. The above names refer to plants collected near Tulbagh and in the Cold Bokkeveld. Specimens collected on Genadendal Mt. in the Caledon Division (*Galpin* 4719) look very

similar to *G. inflatus*, but as the locality is so different, and as Thunberg made no mention of a "white diamond-shaped blotch with a brown border" on the three lower segments of the flower, stated to be present on Galpin's plant, I very much doubt if it is the same species. It may possibly belong to *G. rogersii* Baker, mentioned below' (*J. Linn. Soc.* 48 : 23.1928).

The plant described by Baker in the *Flora Capensis* as *G. inflatus* is *G. ornatus* Klatt, as was pointed out by Brown. Galpin's specimens from Genadendal Mt. are the same as *G. hastatus* Thunb., which is regarded as a form of *G. inflatus*. The locality is by no means as different as N. E. Brown considered it to be for the species is now known to occur on most of the mountain ranges extending from the Clanwilliam district to the northern Caledon district.

Regarding *G. hastatus*, N. E. Brown wrote as follows: 'One sheet. This is not at all like the plant with which it has been incorrectly identified by Baker and described by him as *G. hastatus*, but is a distinct species which I cannot match with any specimen in the Kew Herbarium. It is much like *G. inflatus* Thunb. (not of Baker), but differs in having the lower middle segment marked with a hastate (yellow?) spot outlined with dark red or purple. Thunberg's specimen is the type of *G. hastatus* Thunb. *G. hastatus* Baker in the *Flora Capensis* 6 : 140, is entirely different and is a mixture of at least three species, according to the Kew material' (*J. Linn. Soc.* 48 : 22).

The confusion about the identity of *G. hastatus* Thunb. was due to Thunberg's mistake in citing Jacquin's figure of *G. angustus* when he described it in 1800. The markings on the lower lobes are very variable in *G. inflatus* and the different forms mentioned above in the description may be found even in plants growing in the same area. In Thunberg's solitary specimen of *G. hastatus* the flower has a conspicuous hastate mark on the lowest lobe and only faint traces of a darker patch on the margins of the lower side lobes, and the lobes are more acute than in the typical Tulbagh form of *G. inflatus*. It is almost identical with some living plants which were collected by Middlemost on the Bossiesveld Mts on the borders of the Caledon district, not far from Genadendal, and was probably collected by Thunberg in that area.

Three collections from the Hex River Mountains, *Esterhuysen* 9203 and 9331 and *Jackson* s.n. (NBG), differ in having a more cylindrical tube and the dorsal lobe comparatively wider, more rounded and hooded. These may prove to be a separate variety of another species but more material is required for examination; none of the few specimens seen is complete with a corm.

CAPE.—Caledon: Wilde Paardeberg, *Stokoe* (BOL 27844); Genadendal Mt., *Galpin* 4719 (K, PRE). Ceres: Michell's Pass, *Lewis* 5021 (SAM); Slab Peak, Michell's Pass, *Esterhuysen* 6183 (BOL); near Ceres, *Lotsy & Goddijn* 913 (L), *Hutchinson* 568 (BOL, K, PRE), *Rogers* 28795 (Z), *Acocks* 1806 (S); top of Gydo Pass, *Lewis* 2639 (SAM), *Maguire* 1769 (NBG); Witsenberg Vlake, *Compton* 20998 (NBG); Inkruip, Witsenberg, *Esterhuysen* 23379 (BOL, K); Schurftberg, *Barker* 3112 (BOL, NBG, PRE); Cold Bokkeveld, near Ceres, *Bolus* 8390 (BOL); Schurweberg (next to Bokkeveld Tafelberg), *Esterhuysen* 20629 a (BOL); peak E. of Tarantula Peak, *Esterhuysen* 21843 (BOL). Clanwilliam: Cedarberg, *Primos* in herb. Marloth 11708, partly (PRE); Schimmelberg, *Pillans* 9100 (BOL); Olifants River Mts, behind Warm Baths, *Stephens* 7079 (BM, BOL, K, SAM); Elands Kloof, *Esterhuysen* 3182 (BOL). Paarl: French Hoek, *Phillips* 1319 (SAM); Tierkloof, Wemmershoek Mts, *Esterhuysen* 17726 (K, LD, NBG); April Peak, *Compton* 10155 (NBG). Piketberg: Twenty-Four Rivers Mts, *Esterhuysen* 16092





Pl. 22.

G. bullatus

Species 80

(BOL), 23770 a (BOL, K); Dasklip Pass (also as Cardouw Pass), *Lewis* 3653 (SAM), 6218 (NBG), *Barker* 8108 (NBG); mountain above Porterville, *Loubser* 457 (NBG). Stellenbosch: Jonkershoek, *A. Bolus* in herb. Guthrie 4932 (BOL). Tulbagh: Tulbagh, *Pappe* (K, SAM), ? *Zeyher* (S), *Marloth* 7096 (PRE); Tulbagh valley, *Esterhuysen* 17538 (BOL); Sneeuwgat valley, Tulbagh, *Thorne* (SAM 50398); Saron, *M. Schlechter* 10668 (BOL, PRE, Z); Winterhoek, near Tulbagh, *Bolus* 5244 (BM, BOL, K—type of *G. bolusii*), *Phillips* 1868 (SAM). Worcester: Waaihoek Mts, *Esterhuysen* 9010 (BOL), 14585 (BOL, PRE); Stettynskloof, *Esterhuysen* 17654 (BOL); Slanghoek Mts, Witteberg, *Esterhuysen* 9471 (BOL, K), 16575 (BOL, NBG, K), 17812 (BOL), *Wasserfall* 637 (BOL, NBG); Slanghoek Mts, *Pourie* 55 (NBG); Audensberg, *Marloth* 2440 (BOL, PRE), *Esterhuysen* 3177 (BOL), *Compton* 9755 (NBG); Brandwag Peak, *Esterhuysen* 10985 (BOL); Hex River Mts, *Marloth* 2566 (B, BOL); Bossiesveld Mts, Jonaskop, Langeberg Peak, *Middlemost* 2307 (NBG).

WITHOUT LOCALITY: *Retzius* (LD); *Thunberg*, sheets 1033, 1034 in herb. *Thunberg* (UPS), *Thunberg*, sheet 1032 (UPS—type of *G. hastatus*).

var. *β. louiseae* (L. Bol.) Oberm., comb. nov. *G. louiseae* L. Bol. in Ann. Bolus Herb. **3** : 182 (1924). Type: Cape, Ceres exhibit at Cape Town Wild Flower Show, comm. *L. Guthrie* (BOL 14195, holo., K).

The exact locality of this variety was not known when it was described as a new species in 1924 from plants from the Ceres district exhibited at the Cape Town Wild Flower Show in October 1921. It was named in honour of Miss Louise Guthrie, botanist and artist on the staff of the Bolus Herbarium at that time, who did some sketches of the flowers. Since then it has been collected in various parts of the Ceres district and on the borders of adjoining districts and a great deal more is known about its habitat and variations in the colouring and size of the flowers, but nevertheless it remains rather a puzzling entity which requires further study in the field. Typical of this variety is the small sheathing upper bract. In some cases, however, especially in some specimens from near Laingsburg, the bracts are intermediate in shape between var. *inflatus* and var. *louiseae*.

Recorded from the same areas as the typical variety; occasional in rock crevices or stony ground on mountain slopes and plateaux in the Ceres, Clanwilliam and Laingsburg districts of the Cape, flowering from September to November.

CAPE.—Ceres: near Theronberg Pass, between Karooport and Ceres, *Dymond* NBG 1939/33 (BOL K, SAM); Hottentotskloof, *Acoks* 1638 (S); De Keur, *Barker* 3107 (BOL, NBG); Laakenvlei, *Compton* 12068 (NBG); Swaarmoed, *Loubser* 979 (NBG); Ertjieslandkloof, *Barker* 3028 (NBG, PRE); top of Gydo Pass, *Compton* 18765 (NBG), *Leipoldt* 3055 (BOL, K) BOL. 21827 (BOL, K, PRE); Gydoberg, *Leighton* 2246 (BOL, PRE); Cold Bokkeveld, Driefontein, *Marloth* 6134 (PRE); south Cold Bokkeveld, *Bond* 655 (NBG); without precise locality, Ceres Wild Flower Show, comm. *Barker* 275, 276 (NBG), *Hutchinson* 623 (K, PRE), *Lewis* (BOL 27850), *L. Guthrie* (BOL 27851); Ceres exhibit, Cape Town Wild Flower Show, comm. *L. Guthrie*, Bolus Herb. 14195 (BOL, K). Laingsburg: between Matjiesfontein and Karooport, *Hutchinson* 447 (K).

(*b*) ssp. *intermedius* Lewis, subsp. nov., a subsp. *inflato* floribus caeruleis vel caeruleo-griseis vel malvinis c.3–4 cm longis, ringentibus tubo brevi arcuato differt.

Type: Cape, Laingsburg, Witteberg, *Compton* 3326 (BOL, holo.).

Corm usually with a thicker and lower fibrous neck, up to 14 cm long, uppermost leaf reduced to an acute or obtuse sheath 2–8 cm long, seldom acuminate or up to 10 cm, and *flowers* usually blue, mauve-blue or grey-blue

with yellow markings as in *G. inflatus* but the tube usually more sharply bent and flowers more cernuous with the lower lip sometimes more distinctly projecting.

This subspecies occurs further east and has been recorded from Montagu and Laingsburg to Uniondale and Willowmore, often locally frequent on sandy soil among rocks and bushes on mountain slopes from 1 000–2 000 m altitude, flowering from September to December.

CAPE.—Ladismith: Seven Weeks Poort, *Phillips* 1526 (SAM), *Taylor* 4727 (PRE), *Stokoe* 1862 (PRE), *Andrae* 1213 (PRE); S. slopes of Swartberg below Toorkop, *Esterhuysen* 13939 (BOL, K, LD, NBG, PRE); Torenberg Mt., *Wurts* 1115 (NBG). Laingsburg: Witteberg, *Compton* 3142 (BOL), 3326 (BOL, K), 15225, 16273 (NBG), s.n. (BM), *Archer*, BOL 20304 (BOL, K), *Lewis & Barker* NBG 2683/32 (K, SAM); Elandsfontein, Witteberg, *Compton* 3797 (BOL). Montagu: Eendrag, *Lewis* 4719 (SAM), *Compton* 18406 (NBG); Laatsrivier, *Ryeroft* (NBG); Koo, slopes of Naudesberg, *Lewis* 6055 (NBG); N.W. entrance to Koo valley, *Loubser* 2060 (NBG). Oudtshoorn: Moeras River bridge on Robinson Pass road, *Van Niekerk* 462 (BOL). Prince Albert: Swartberg, *Stokoe* (SAM 60209); near top of Swartberg Pass, *Bolus* 12353 (BM, BOL), *Barnard* (SAM 48192), *Stokoe* (SAM), *Lewis* 6169 (NBG), *Lanjouw* 543 (U), *Acocks* 15533 (PRE), *Lam & Meeuse* 4627 (L, S), *Schimper* (Z), *Marloth* 2490 (PRE); Blesberg, *Esterhuysen* 24910 (BOL). Uniondale: Potjiesriviershoogte Pass, *Acocks* 21410 (PRE); Avontuur hills, *Fourcade* 4609 (BOL, K); 13–14 km from Avontuur and Kamanani, *Fourcade* 5665 (BOL, NBG). Willowmore: Antoniesberg, *Esterhuysen* 24952 (BOL); near Willowmore, *Andrae* 973 (PRE).

The specimens placed in this subspecies approach *G. rogersii*. The long fibrous neck of the corm and more rounded 4-grooved and spine-tipped leaves indicate that its habitat is in rock fissures on mountain ranges whereas the sand-loving *G. rogersii* has no neck and flatter leaves. The flowers do not show such a pronounced projecting lower lip and there are but a few on each spike whereas *G. rogersii* usually displays up to 10 flowers.

The various local forms of this complex species require further study in the field, not an easy task as most of them occur at fairly high altitudes where they are accessible only to mountaineers. Like other members of the same group they are difficult to grow, which no doubt accounts for the fact that although the species was first collected nearly two hundred years ago there are no illustrations in any of the early botanical works. The Tulbagh form, figured as *G. bolusii* in the *First Book of South African Flowers* in 1928, was the first illustration of this species to be published. Another form was figured in 1951 in Rice and Compton's *Wild Flowers of the Cape of Good Hope*, t.204 f.2.

79. **Gladiolus rogersii** Bak., Handb. Irid. 208 (1892). Type: Cape, without exact locality, *Moyle Rogers* (K, holo.). (The locality 'Cape Flats' may be an error.) (See fig. 44.)

Common name: Riversdale Bluebell.

Corm ovoid or subglobose, 1–2 cm diam.; tunics pale to dark brown, thin, more or less reticulate and slit up into numerous fibrous or somewhat lignified teeth. *Stem* usually slender, straight or flexuose near top, 30–65 cm high, or taller, stouter and occasionally up to 1 m in robust form, with 2–3 basal sheaths, the outer 1–10 cm long, hyaline, orange or brownish, second purple or orange with purple tip, third up to 15 cm long, dark green, purple or mottled with purple and white or green and white. *Leaves* 3–4, rarely 5, the lowest usually



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Type specimen:

Cape Flats
1854.
in the Cape Papers

GLADIOLUS ROGERSII, Baker.

1. The first step is to identify the main components of the system. This includes the hardware (CPU, memory, storage) and software (operating system, applications).

2. The second step is to analyze the system's performance. This involves monitoring key metrics such as CPU usage, memory usage, and disk I/O.

3. The third step is to optimize the system. This can be done by adjusting system settings, upgrading hardware, or rewriting code.

4. The fourth step is to test the system. This ensures that the changes made in the previous steps have not introduced any new issues.

5. The fifth step is to document the system. This includes creating a user manual, a system architecture diagram, and a list of system components.

6. The sixth step is to maintain the system. This involves regular updates, backups, and monitoring for any new issues.

7. The seventh step is to evaluate the system. This involves comparing the system's performance against the original requirements and goals.

8. The eighth step is to report the results. This involves creating a report that summarizes the findings of the analysis, optimization, testing, and evaluation.

9. The ninth step is to implement the changes. This involves making the necessary changes to the system based on the findings of the report.

10. The tenth step is to monitor the system. This involves continuing to monitor the system's performance and making any necessary adjustments.

[illegible]

g. and G. haem.
1932, v. 92, p. 481

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FIG. 44. Type of *G. rogersii* Bak.

Photo: By courtesy of Royal Botanic Gardens, Kew.

half sheathing with a long linear blade 1–2 mm or occasionally up to 3 mm wide (in var. *graminifolius* up to 9 mm wide), overtopping the spike or shorter, in eastern form often only half as long as stem, soft and grass-like to firm, with more or less prominent margins and midrib, sometimes thick and somewhat fleshy near the coast; second usually shorter than lowest with sheath comparatively longer and blade shorter, and 1 or 2 upper much shorter, the uppermost sometimes reduced to a small bract-like sheath 2–3 cm long. *Spike* simple or very rarely branched, second, usually 1–5-flowered, up to 14 in robust form. *Bract* oblong, ovate-oblong or oblong-lanceolate, obtuse to acute or acuminate usually subnavicular, green or grey-green with narrow hyaline margins, 1.5–4 cm long, bracteole shorter than bract, minutely bidentate. *Flowers* small, up to 5 cm long, cernuous, inflated-campanulate with dorsal lobe slightly hooded and a conspicuously projecting lower lip, pale to deep blue, mauve or purplish, rarely pinkish, with darker streaks or dots on lower half of lower lobes and more or less outlining yellow marks above, usually cruciform or an irregular transverse band on laterals and cruciform, hastate or lanceolate on lowest. *Perianth tube* 0.9–1.6 cm long, occasionally up to 2 cm, sharply bent near middle and funnel-shaped above; *lobes* unequal, the dorsal largest, broadly obovate or suborbicular, obtuse, often retuse, occasionally broadly elliptic and subacute, 2–3 cm long, 1.6–2.8 cm wide; upper laterals similar to dorsal but shorter, slightly smaller and usually subacute or acute; 3 lower unguiculate, connate for 5–8 mm, the laterals as long as dorsal or slightly longer, spatulate or oblong-spatulate, obtuse, 0.7–1.5 cm wide, and lowest distinctly shorter and slightly wider, elliptic or broadly ovate above the short claw, acute or subacute, up to 1.6 cm wide. *Stamens* arcuate, arising near middle of tube and reaching about middle of dorsal lobe; filaments 1.4–1.6 cm long; anthers linear, subsagittate, 0.6–1.2 cm long. *Ovary* ellipsoid or oblong, 4–6 mm long; style reaching top of anthers or a little below, with spatulate or obcordate-spatulate conduplicate branches 3–4 mm long.

Found in the south-eastern Cape from around Bredasdorp to Humansdorp along the coast, on flats and mountain slopes up to 1 000 m, usually in sandy soil, also on limestone near the coast and occasionally gravelly-clay soil on mountains; occasional or locally frequent among Restionaceae clumps or bushes where they are protected; flowering from August to November.

Two varieties are recognized.

KEY TO VARIETIES

- Corm without a neck. Basal leaf hard with the blade 2–4 mm wide, sometimes thick and somewhat fleshy, midrib and margins more or less prominent .. (a) var. *rogersii*
 Corm produced into a neck 7–10 cm long, reddish brown. Basal leaf soft and grasslike, with the blade 2–9 mm wide, midrib slightly prominent .. (b) var. *graminifolius*

(a) var. **rogersii**. *G. rogersii* Bak., Handb. Irid. 208 (1892), Fl. Cap. 6 : 146 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 224 (1893); N.E. Br. in J. Linn. Soc. 48 : 23 (1928), Gard. Chron. ser. 3, 93 : 27 (1933); R. A. Dyer in Flower.

3-14 bl. in 31 S. Afr. Bot. 50:452 (1904)
 flowering, back basal fibrous neck. Corm thick
 and clavate.

Pl. S. Afr. **23**, t.919 (1943). Type: Cape, without exact locality, *Moyle Rogers* (K, holo.).

G. involutus sensu Bak., Handb. Irid. 209, Fl. Cap. **6** : 147; non Delarochc 1766. *G. bolusii* Bak. var. *burchellii* Bol. f. in Ann. Bolus Herb. **2** : 101 (1917); L. Bolus, Barclay & Steer, First Book S. Afr. Flrs t.133 (1928). *G. burchellii* (Bol. f.) Ingram in Gard. Chron. ser. 3, **92** : 482 (1932). Type: Cape, Knysna district, Groenvallei, west end, *Burchell* 5631 (K, holo.).

A rather poor illustration of this species was published in 1943 in *Flowering Plants of South Africa*, where Dr R. A. Dyer wrote about it as follows: 'The Riversdale "bluebell", as this plant is commonly known, grows abundantly in several districts of the Cape Province from Swellendam to Humansdorp. In the original description Baker gives the type locality as "Cape Flats", but N. E. Brown in his paper in the *Journal of the Linnaean Society*, 1928 suggested that this was an error, since no other specimen agreeing with it has been collected so far west. . . .

As with many other members of the family *Iridaceae* in South Africa, this plant, according to N. E. Brown, has been confused on several occasions with closely allied species, for example, Baker included specimens of it under the names *G. inflatus* and *G. involutus*, and it has also been classified as a variety of *G. bolusii* Baker (var. *burchellii*). N. E. Brown discussed this aspect in his paper mentioned above, based on the specimen of *South African Iridaceae* in Thunberg's Herbarium, at Uppsala, Sweden. Brown makes a further comment on the confusion of names in an article in *South African Gardening and Country Life*, 1933, 267. C. Ingram was not entirely satisfied with Brown's identification, and added yet another combination of names for our plant, *G. burchellii* (Bolus) Ing., in *Gardener's Chronicle* 1932, 482. Dr L. Bolus, who was good enough to examine our specimen, agrees with the identification as *G. rogersii* Baker, but pointed out that the differences between some of the related species are certainly very slight. The type plant of *G. rogersii* was named after the Rev. W. Moyle Rogers, who collected it in 1859.'

The plant figured was sent to Pretoria from the Knysna district, probably the correct type locality, but was evidently rather faded on arrival as the illustration is not a very good one. It was collected by Thunberg on his travels but identified by him as *G. inflatus*; there is no specimen in his herbarium in Uppsala but there is one collected by him in the Natural History Museum Herbarium in Stockholm.

Two characters which distinguish *G. rogersii* from *G. inflatus* are its fairly small corm, with softer tunics and no fibrous neck—or in the new variety described here only a thin submembranous neck—and its more cernuous flowers with a more conspicuous projecting lower lip in which the two side-lobes are nearly always distinctly longer than the lowest, with long narrow claws and rounded tips. The flowers are more like those of *G. bullatus*, the Caledon Bluebell, which is well distinguished by the long tapering tips of its larger and more conspicuously veined bracts.

G. rogersii is widespread on flats and mountain slopes in the southern coastal districts, with two or three distinct local forms and the new variety described here which comes from a little further inland, on the northern side of the Langeberg range. Where it occurs in limestone near the coast in the Bredasdorp and Swellendam districts the flowers are a deep purple-blue or almost violet colour and the upper basal sheath of the stem is mottled with purple and white or green and white, as in *G. carinatus*. A very fine taller and more robust form among tall *Restionaceae* on sandy flats in the Riversdale district often has as many as 10–14 flowers to a spike and very occasionally produces a branch. The lower side-lobes of the flower in this form are often not much longer than the lowest. In the eastern form in the Humansdorp district the lowest leaf is considerably shorter than usual, sometimes more or less falcate, and the perianth tube is usually longer.

COLOUR PLATE 21. G. J. LEWIS.—Corm and base of stem showing spotted basal sheath; flower spike; flower front view; flower laid out; bract and bracteole. This form is common in southern areas of Bredasdorp.

Cape.—Bredasdorp: near Cape Agulhas, *Robinson* (77830 NBG). September 1964.

CAPE.—Bredasdorp: The Poort, near Bredasdorp, *Barker* 2506 (BOL, NBG) *Compton* 9091 (NBG); Cape Agulhas, *Nordenstam* 1456 (NBG), *Robinson* (NBG); Brandfontein, *Esterhuysen* 19089 (BOL); Potteberg, *Esterhuysen* 23171 (BOL). George: George, *Prior* (K), *Schlechter* 2367 (K); 19 km E. of George, *Salter* 6915 (BM); Kaaimansgat, *Drège* 3490 (B), s.n. (P, S); Swart River gorge, *Acoccks* 21243 (PRE); Victoria Bay, *Barker* 8173 (NBG), *Compton* 15766 (NBG); Rondevlei, *Van Rensburg* 6 (BOL); Montagu Pass, *Schlechter* 5788 (AMD, BOL, GRA, K, PRE, Z), *Purcell* (Z); Montagu Pass, near Herold, *Middlemost* 2104 (NBG); Outeniqua Pass, *Compton* 24414 (NBG). Humansdorp: Ratelsbos, *Fourcade* 499 (BOL, GRA, K, Z); Witelsbos, *Fourcade* 1729 (BOL). Knysna: Groenvallei, W. end, *Burchell* 5631 (K—type of *G. bolusii* var. *burchellii*); between Groenvallei and Swartvallei, *Burchell* 5683, partly (K); Lake Pleasant, *Acoccks* 21373 (NBG); Bloukrans Pass, *Schelpé* 4351 (BM, SAM); 6 km S. of Bloukrans Pass, *Baylis* 657 (NBG); Groot River, *Salter* 6953 (BOL, SAM), *Barker* 6054 (NBG); Knysna, *Newdigate* 73 (SAM); between Plettenberg Bay and Humansdorp, *Rodin* 1174 (BOL, K, PRE); Knysna district, *Laughton*, PRE, 27037 (K, PRE); Millwood, *Marloth* 2468 (PRE); Woodlands, *Galpin* 4720 (K, GRA, PRE); Keurbooms River valley, *Humbert* 10063 (P). Mossel Bay: Mossel Bay, *Lindeberg* (S), *Penther* 766 (Z); Ruitersbos, *Van Niekerk* 69 (BOL, PRE); Robinson Pass, *Bolus* 14950 (BOL), *Hops*, BOL 10056 (BOL, PRE), *Salter* 6346 (K), *Rogers* 4269 (GRA). Riversdale: Riversdale, *Loubser* 910 (NBG), *Marloth* 5336 (PRE), *Versfeld* (BOL 14807); Albertinia, *Muir* 872 (BOL, K, PRE, SAM); S. of Riversdale on Blombos road, *Lewis* 6527 (NBG), *Thomas* (NBG); Still Bay, *Muir*, herb. *Galpin* 7791 (PRE), *Thomas* (NBG); Gouritz River Mouth road, *Horrocks* 39 (NBG); Garcia's Pass, *Phillips* 411 (K, SAM), *Thorne* (SAM 41620), *Lewis* 5640 (NBG); Oubos, Langeberg, *Taylor* 242 (BOL). Swellendam: Tradouw Pass, *Martin* 395 (NBG), *Stayner*, (NBG) Tradouw Mts, *Marloth* 8449 (PRE), *Drège* 1839 (S); Swellendam Mts, *Barnard* (SAM 28919), *Mackrell* 1818 (BM); 10 o'clock Mt., *Wurts* 340 (NBG); Lemoenshoek Peak, *Esterhuysen* 25016 (BOL); Voormansbos, *Pappe* (K); Voormansbos—Grootvadersbos, *Zeyher* 3984 (G, K, P). Uniondale: Prince Alfred Pass, *Fourcade* 4861 (BOL, K), *Acoccks* 21650 (K, PRE), *Middlemost* 2186 (NBG), *Rourke* 611 (NBG); Outeniqua Mts, between Avontuur and Knysna, *Fries*, *Norlindh* and *Weimarck* 1606 (LD, SAM).

WITHOUT LOCALITY: *Moyle Rogers* (BM, K—locality 'Cape Flats'); *Drège* (BM, OXF); *Sparrman* (S); *Thunberg* (S).

(b) var. **graminifolius** Lewis, var. nov., a var. typica cormo in collum 7–10 cm longum rubro-brunneum producto, folii lamina basalis 2–9 mm lata molli graminiformi, foliis superioribus 2 ad vaginam acuminatam vel acutam reductis differt.

Type var.: Cape, Montagu district, Scheepersrus, *Barker* 5427 (NBG, holo.).

Differs in having a thin submembranous reddish brown neck 7–10 cm long above the corm and only the lowest leaf with a blade 2–9 mm wide, soft and grasslike with midrib slightly prominent, the 2 upper leaves reduced to acuminate or acute sheaths.

Fairly frequent on shaly mountain slopes from 400–1 000 m altitude, flowering in July to August.

Cape. — Ladismith; West end of Touwsberg, *Wurts* 1434 (NBG). Montagu: Klipskui, S.E. of Montagu, *Acocks* 20541 (NBG, PRE); Scheepersrus, *Barker* 5427 (NBG). Swellendam: Tradouw Mts, *Drège* (K); near Barrydale, *Barker* 5399 (NBG).

80. ***Gladiolus bullatus*** Thunb. ex Lewis in Bot. Notiser **119** : 286 (1966). *G. bullatus* Thunb. MS. in herb. Type: Cape, *Thunberg* 1012 (UPS, holo.). *G. inflatus* sensu Klatt in *Linnaea* **32** : 710 (1863) excl. syn *G. ringens* Red.; non Thunb. 1800. *G. spathaceus* Pappe ex Bak., Handb. Irid. 208 (1892), Fl. Cap. **6** : 147 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 224 (1893); Marloth, Fl. S. Afr. 4, t.48c (1915); N.E. Br. in J. Linn. Soc. **48** : 20 (1928); L. Bol., Barclay & Steer, First Book S. Afr. Flrs t.134 (1928), Second Book t.165 (1936); Rice & Compton, Wild Flrs Cape of Good Hope t.206 f.1 (1951); Pappe MS. in herb; non L.f. 1781. Type: Cape, Caledon district, Swartberg, *Pappe*, s.n. (K, holo., BM, SAM).

Common name: Caledon Bluebell.

Corm subglobose to ovoid up to 2 cm in diam., with hard coarse brown lignified imbricate tunics cut up into claws from the base, forming a short neck above. *Stem* slender, simple, 35–70 cm high, with 2 basal sheaths, the inner up to 18 cm long. *Leaves* 3–4, sheathing the stem to the rachis, the sheathing part hard and ribbed, abruptly narrowed above into a free tail-like short blade, not overtopping the spike. *Spike* 1–2-flowered, secund. *Bracts* lanceolate-acuminate, the apex often acicular 3–7 cm long, dull dark green, closely ribbed, firm. *Flowers* cernuous, exerted laterally from the bracts, inflated campanulate, about 5 cm long, with the lower lip prognathous, pale to fairly deep blue or mauve-blue, the lower part of the 3 lower lobes paler, spotted with mauve or purple and with a yellow median stripe or hastate mark on the lowest lobe and on the laterals with an irregular transverse band. *Perianth tube* curved, short, widely funnel-shaped, 1–1,3 cm long; 3 upper lobes subequal, dorsal slightly larger, orbicular-obovate, 2–3,3 cm long, 1,4–2,8 cm wide; 3 lower longer and narrower, connate for 0,7–1 cm, the laterals spatulate or oblong-spatulate, obtuse or subacute, 3–4 cm long, 0,9–1,6 cm wide near apex; the lowest usually shorter and broader. *Stamens* arcuate, arising near middle of tube, filaments 1–1,3 cm long; anthers linear, subsagittate, 0,6–1 cm long. *Capsule* ellipsoid c. 2 cm long, firm, pale, with slightly oblique transverse parallel veins; *seeds* small, rhomboid-oblong, 4–6 mm long, yellow-brown.

Confined to the Caledon and Bredasdorp districts of the Cape Province where it is found in sandy soil among rocks on hills and mountains, flowering from August to October.

COLOUR PLATE 22. G. J. LEWIS.—Corm and stem; flower spike; bract and bracteole; flower front view; flower laid out.

Cape.—Caledon: Paardeberg, *Lewis* 6107 (NBG). August 1962.

CAPE.—Bredasdorp: near Elim, *Bolus* 7877 (BOL, K, PRE), *Barker* 2465 (NBG); between Stanford and Elim, *Barker* 148 (BOL, K, PRE); Springfield Estates, *Stokoe* (SAM 60220); 16 km N. of Baard-skeerdersbos, *Thomas* (NBG); Ratel River, *Barker* 2484 (BOL, NBG). Caledon: Swartberg, *Pappe* (BM, SAM, K—type of *G. spathaceus* Pappe), *Ecklon & Zeyher* 148 (G, K, LD) et s.n. (BR, C, L, LD, PRE, UPS, Z), *Worsdell* (K); near Caledon; *Marloth* 8831 (PRE); near spring, *Templeman* in herb. MacOwan 2617 (GRA, S) HAA 282 (BM, BOL, G, GRA, K, P, SAM, PRE, UPS); Caledon, *Zeyher* 458 (SAM), *Marloth* 10553 *Guthrie* 2384, 3830 (BOL), *Prior* (K, PRE); Genadendal, *Prior* (K) *Roser* (PRE), *Kogel* (B); Kleinriviersberg, *Zeyher* 3985 (G, K, P, PRE, S, Z); near Hermanus, *Bolus* 9835 (PRE), *Moss* 29054 (BM), *Purcell* (SAM 46268); Buffelskloof, Hangklip, *Barker* 8037 (NBG); Houhoek Mt., *Schlechter* 5468 (PRE, BOL, GRA), *Wilman* 779 (BOL). Caledon—Bredasdorp: between Elands-kloof and Paardeberg Mts, *Lewis* 6092 (NBG). Without locality: *Thunberg* (UPS—sheet 1012 in herb. Thunberg); *Sparman* (S); *Kolbing* 23 (G).

This slender species, with its delicate blue or mauve-blue bell-shaped flowers, is one of the most beautiful in the genus, but even for the most experienced horticulturist it is one of the most difficult to grow. It is significant that no descriptions or illustrations are to be found in botanical works of the eighteenth and nineteenth centuries, while the few specimens preserved in the old herbarium collections are all plants from the field and none of them cultivated in Europe, indicating that the early horticulturists were no more successful than those of today. As it is still fairly common on hills and mountain slopes in the Caledon and Bredasdorp districts it could not have escaped the notice of the early plant collectors.

Pappe's MS. name, *G. spathaceus*, taken up by Baker and first published in 1892, refers to the comparatively large bracts, tapering to long finely pointed tips and rather conspicuously veined, by which the species is readily distinguished from others in the group with bell-shaped flowers. Unfortunately this name cannot be retained as it is a later homonym of *G. spathaceus* L.f. (= *Babiana spathacea* (L.f.) Ker), published a little over a hundred years earlier. In a paper on the *South African Iridaceae* in Thunberg's Herbarium N. E. Brown stated that a sheet of Thunberg's, with his MS. name *G. bullatus*, was the same as *G. spathaceus* Pappe, and as this is the only other name to be associated with the species this name has been validated.

NOTE. In the *Bot. Notiser* 119 : 286 (1966) Lewis ascribes the publication of the name *G. bullatus* Thunb. MS. to N. E. Brown in *J. Linn. Soc.* 48 : 20 (1928). Since, however, N. E. Brown considered it to be a synonym of *G. spathaceus* Pappe ex Bak. and therefore not the correct name, it cannot be regarded as validly published by him (cf. articles 43 and 46 of the Code).

81. **Gladiolus pritzelii** Diels in Bot. Jahrb. 44 : 118 (1909). Type: Cape, Calvinia district, Hantamsberg, *Diels* 738 (B, holo.).

Corm ovoid, 1,2–1,8 cm diam.; tunics brown or reddish brown, imbricate, coarse or moderately coarse, cut up into acuminate teeth below, sometimes with a tuft of bristles at the top or a thin dark brown submembranous neck

above. *Stem* slender, simple, 30–50 cm high or occasionally up to 70 cm, sheathed nearly to the top and more or less flexuose above; basal sheaths 1 or 2, the outer hyaline, obtuse, 4–12 cm long, inner when present up to 15 cm, green and hispidulous. *Leaves* 3 (rarely 4), the lowest usually reaching to base of spike or a little above, with lower $\frac{1}{4}$ to $\frac{1}{2}$ sheathing and varying from finely striate and hispidulous to pilose with more or less reflexed hairs, rarely glabrous, the blade in the typical form linear, 1.5–3 mm wide, sparsely and minutely hispidulous, with the margins and 1 or 2 nerves slightly prominent, in others not more than 1 mm wide with very prominent margins and midrib, often subterete and sulcate, glabrous or pilose; second with a much longer sheath and shorter subulate blade and uppermost much shorter. *Spike* second, 1–3-flowered, the flowers more or less cernuous. *Bract* subnavicular or navicular, oblong-lanceolate, acuminate or acute, 2–3.5 cm long, green or grey-green with narrow hyaline margins; bracteole shorter than bract, sometimes notched at the apex. *Flowers* small, somewhat ventricose-campanulate with the dorsal lobe arcuate and a projecting lower lip, yellow with darker yellow or brownish patches on lower lobes, sometimes tinged with red or grey outside, scented. *Perianth tube* 0.7–1.2 cm long, sharply bent near middle and funnel-shaped above; *lobes* usually very shortly cuspidate, the dorsal hooded, obtuse or sub-obtuse, 2–3 cm long, 1.4–2 cm wide; upper laterals somewhat rhomboid, obovate or elliptic, subacute or acute, up to 2.5 cm long, 1.2–1.8 cm wide; 3 lower 2.4–3 cm long, connate for about 5 mm, the laterals obovate, oblong-spathulate or subcuneate, 0.9–1.2 cm wide, and lowest like upper laterals but slightly smaller. *Stamens* arcuate, arising near middle of tube; filaments 1.2–1.5 cm long; anthers linear, subsagittate, minutely apiculate, 0.7–1 cm long. *Ovary* ellipsoid or oblong, 4–5 mm long; style reaching middle or top of anthers, with obcordate or spatulate conduplicate branches 3–5 mm long.

A rather rare montane species found in the western Cape in the Calvinia, Clanwilliam, Ceres and Sutherland districts at altitudes up to 2 200 m, occasional among rocks and bushes, flowering from August to October.

Two varieties are recognized:

KEY TO VARIETIES

- | | |
|---|---------------------------|
| Spike 1–3-flowered; flowers cernuous, somewhat bell-shaped, prognathous, yellow with darker yellow or brownish patches on lower lobes | (a) var. <i>pritzelii</i> |
| Spike closely 3–6-flowered; flowers patent, more rounded in shape, yellowish-green | (b) var. <i>sufflavus</i> |

(a) var. **pritzelii**

G. pritzelii Diels in Bot. Jahrb. **44** : 118 (1909); Pole Evans in Flower. Pl. S. Afr. 2. t.68 (1922). Type: Cape, Calvinia district, Hantamsberg, *Diels* 738 (B, holo., NBG, PRE, photo.).

There are two or three forms of this delicate yellow-flowered variety. Only one exact locality is recorded in the Ceres district but in the Bolus Herbarium there are several specimens from the Ceres Wild Flower Shows which probably

came from the same area, on the mountains bordering the Ceres and Clanwilliam districts.

The typical form in the Calvinia and Sutherland districts has two basal sheaths and flat linear leaves, soft and somewhat grass-like with margins and veins not very much raised, and minutely pubescent, especially on the lower sheathing part. On mountains in the Clanwilliam district the plants have a single basal sheath and more slender but firmer leaves with the midrib and margins very prominent, sometimes so much so that the leaves are more or less rounded and 4-grooved, and in some areas they are covered with soft silky hairs, especially the sheath. It is not certain whether the flowers are scented in all the forms as it is not recorded but they are known to be scented in the typical and are very fragrant in the variety.

CAPE.—Calvinia: Hantamsberg, *Diels* 738 (B); Calvinia, *Pritzel* (B, Z), *Rosenblatt* NBG 2032/35 (BOL); Driefontein, S.W. of Calvinia, *Marloth* 10425 (PRE, STE). Ceres: Cold Bokkeveld, base of Schoongezicht Peak and N. slopes towards Olifants River Dome, *Esterhuysen* 31284 (NBG). Clanwilliam: Cedarberg Tafelberg, *Esterhuysen* 13040 (BOL, K); Middelberg, *Compton* 6621 (NBG); Sneeuweburg, *Taylor* 6147 (PRE); Cedarberg, *Prinos* in herb. *Marloth* 11709 (PRE); Duivelsgat, S. Cedarberg, *Esterhuysen* 13117 (BOL); Elandskloof, *Compton* 16970 (NBG), *Esterhuysen* 3183 (BOL), *Lewis* in Bolus Herb. 21859 (BOL, K). Sutherland: near Sutherland, *Marloth* 9663 (BOL, PRE, STE), *Du Toit* (BOL 12531); Roggeveld Mts, *Marloth* 8795 (PRE).

(b) var. **sufflavus** Lewis var. nov., a var. typica planta robustior cormo majore in collum 6–9 cm longum producto, vaginae pilosae, lamina in sectione transversa cruciformi, floribus patentibus plerumque globosis differt. Type variety: Cape, Calvinia district, Glenridge farm near Nieuwoudtville, *Lewis* 5730 (NBG, holo.).

Plants more robust, the corm larger, up to 3 cm diam., with softer tunics extending up in a fibrous neck 6,5–9 cm long, the leaf sheaths pilose and blade linear with very prominent margins and midrib, cruciform in section. *Spike* closely 3–6-flowered, the flowers not or hardly cernuous. *Flowers* smaller than in var. *pritzelii* and more orbicular with the lower lip not projecting, yellowish green, usually tinged with brown or reddish brown outside, especially the dorsal lobe. *Perianth tube* 1–1,4 cm long, straight and cylindrical nearly to top then curved and abruptly expanded above; *lobes* smaller than in var. *pritzelii*, the dorsal not more than 2,3 cm long and 1,6 cm wide, and lower laterals more or less cuneate.

Occasional among bushes on sandy flats and hill slopes in vicinity of Nieuwoudtville, west of Calvinia, flowering from August to September.

CAPE.—Calvinia: Bokkeveld, *Watermeyer* in herb. *Marloth* 7562 (PRE); Glenridge farm, near Nieuwoudtville, *Lewis* 5730, 5889 (NBG), *Thomas* (NBG); Nieuwoudtville, *Erlank* (NBG).

The flowers of this more robust variety differ quite markedly in colour and shape from those of the forms described above. They are more or less horizontal instead of drooping and more rounded in shape, with the tips of the upper lateral lobes incurved and of the lower laterals recurved, and the lower lip not projecting much if at all beyond the upper.



FIG. 45. *G. pritzellii* var. *sufflavus*.

FIG. 45. From a painting by G. J. Lewis.—Corm with part of basal leaf and stem; inflorescence with cauline leaves; flower front view; flower laid out; bract; bracteole; and transverse section of basal leaf, $\times 5$.

Cape.—Calvinia near Nieuwoudtville *Lewis* 5730 (NBG) ex hort. M. Thomas. August 1962.

82. **Gladiolus stefaniae** Oberm., sp. nov., *G. sempervirenti* affinis sed foliis hysteranthis 1–3, florescentia Aprili differt.

Cormus globosus 2 cm diam. fibrosus. *Folia* 1–3 hysteranthis menses 4 post flores bene evoluta linearia 35 cm longa 4 mm lata glabra laxa contorta. *Scapus* spicae foliis 3 reductis vaginantibus 2–3 floribus. *Perianthium* magnum c.12 cm diam. rubrum; lobi inferiores albo-costati; lobus superior ovato-lanceolatus c.6,5 cm longus et 3,2 cm latus, ceteri aliquantum minores.

Type: Cape, Montagu district, Cogmanskloof, Kalkoensnes, *Pienaar* s.n. (NBG 90809, holo.).

Corm globose 2 cm in diam. with fibrous tunics. *Leaves* 1–3, developed after flowering, linear, up to 35 cm long, 8 mm broad, with a lax twist, smooth, glabrous, midrib and 2 lateral veins prominent, margin whitish. *Flowering spike* about 40 cm tall, with 2–3 reduced narrow firm bract-like clasping leaves and bearing 2–3 large flowers. *Bracts* lanceolate, acuminate. *Flowers* similar to *G. sempervirens*, fairly regular, widely funnel-shaped with the limb about 12 cm in diam., the spreading lobes ovate-lanceolate, fairly similar in shape, red, the 3 lower with a broad white median stripe; tube funnel-shaped, about 4 cm long; upper lobe 6,5 cm long and 3,2 cm wide, the others somewhat smaller. *Capsule* unknown.

A rare species thrice collected on the mountains near Montagu in the S.W. Cape, flowering in April.

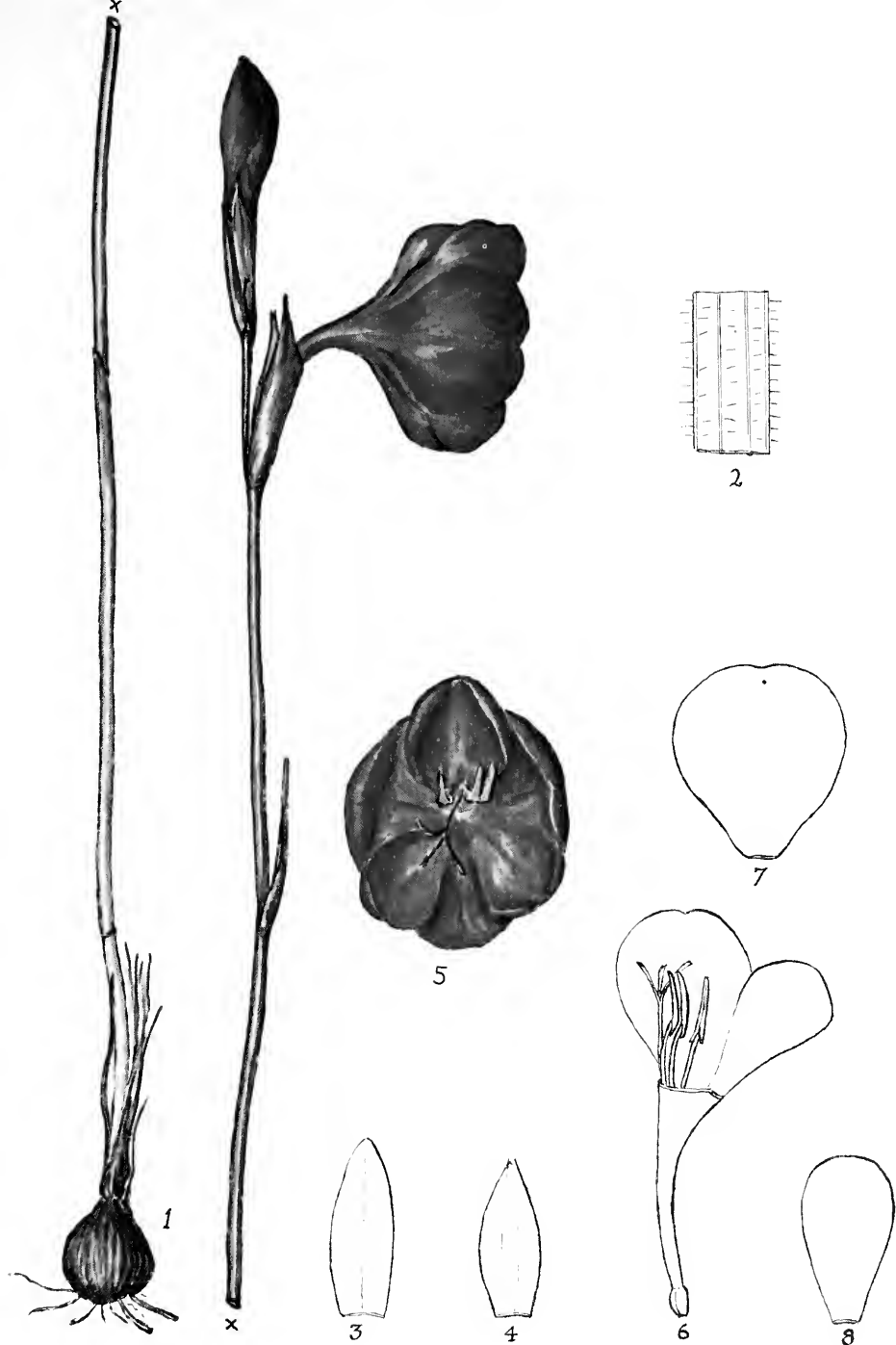
CAPE.—Montagu: Montagu, moist kloof, *Myburgh* s.n. (NBG 81762), *Smith* s.n. (NBG 64419); Cogmanskloof, Kalkoensnes, *Pienaar* s.n. (NBG 90809, holo.).

Apparently an ecological adaptation evolved from the evergreen species *G. sempervirens* which lives in the forests further east. The flowers show great similarity but *G. stefaniae* becomes dormant in summer and produces only 1–3 leaves after flowering in autumn.

This new species is named for Miss Stefanie Pienaar whose father, Mr S. Pienaar, is the discoverer of this species.

83. **Gladiolus stokoei** Lewis in Flower. Pl. Afr. **26** : t.1004 (1947). Type: Cape, Caledon district, Riviersonderend Mts, *Stokoe* (SAM 56457, holo.).

Corm subglobose, about 1,5 cm diam., with tunics of fine brown parallel fibres extending up in a thin neck 3,5–4,5 cm long. *Stem* slender, simple, 30–45 cm high, enclosed at the base in the neck fibres and in an obtuse or subacute sheath 4–5 cm long. *Basal leaf* solitary, not present at flowering time, linear, 25 cm or more long, about 4 mm wide, spirally twisted, pilose, the margins



G. J. Lewis.



G. J. Lewis.

and midrib slightly prominent; *cauline leaves* 2-3, 1,8-13,5 cm long, the lower 1 or 2 closely sheathing, obtuse or subacute, and uppermost with a short acute, or acuminate, free blade. *Spike* secund, rather laxly 1-3-flowered. *Bract* oblong, subacute, 2,5-3 cm long, about 1 cm wide; bracteole slightly shorter than bract, usually bidentate at the apex. *Flowers* medium-sized, scarlet, more or less translucent. *Perianth-tube* 3 cm long, curved above the middle, the upper part narrowly funnel-shaped; *lobes* obtuse, sometimes emarginate, incurved at the apex, the 3 upper suborbicular, 2,8-3 cm long, 2,2-2,8 cm wide; 3 lower obovate, about 2,5 cm long, 1,5 cm wide. *Stamens* arcuate, arising 0,8-1 cm below top of tube; filaments 2 cm long; anthers linear, sagittate, 1 cm long. *Ovary* more or less ellipsoid, 4 mm long; style reaching to top of anthers or shortly above, the branches 7 mm long, linear, slightly expanded towards the apex, conduplicate.

Very local on slopes of the Riviersonderend Mts from 700-1 400 m alt., in the south eastern Cape, flowering in March and April.

CAPE.—Caledon: Riviersonderend Mts, 700-1 400 m alt., *Stokoe* 2173 (BOL, PRE), *Stokoe* (SAM 56457; SAM, PRE).

A striking and very beautiful species only twice collected in the same area by the well-known mountaineer and botanical collector Mr T. P. Stokoe, in whose honour it was named. An outstanding feature is the width of the perianth lobes which are rounded and incurved at the apex, giving an orbicular shape to the flower as seen from the front. This, as well as the semitranslucent scarlet of the flowers, distinguishes it from all other species.

COLOUR PLATE 23. G. J. LEWIS. *Flower. Pl. Afr.* t.1004 (1947). 1, corm and inflorescence; 2, portion of basal leaf \times 3; 3, bract; 4, bracteole; 5, flower front view; 6, side view of flower with four lobes removed; 7, dorsal lobe; 8, bottom lobe.

Cape.—Caledon: slopes of Riviersonderend Mts, 600-1 200 m *Stokoe* (SAM 56457). March 1945.

84. ***Gladiolus nerineoides*** Lewis in *Flower. Pl. Afr.* 25: t.994 (1946). Type: Cape, Somerset West district, Somerset Sneekop, *Valpy* (SAM 54330, holo.).

Corm globose, 1,5-2 cm diam., with tunics of fine brown parallel fibres extending up in a thin neck 2-4 cm long. *Stem* slender, simple, 35-40 cm high, enclosed at the base in a hyaline obtuse glabrous or puberulous sheath 2-4 cm long. *Basal leaf* solitary, not present at flowering time, linear, 35-40 cm long, 5-6 mm wide, pilose, the midrib and 2 other veins slightly prominent, enclosed at the base in a brown or colourless obtuse sheath about 5 cm long; *cauline leaves* 3, the lowest minutely puberulous and others glabrous, 2-9 cm long, closely sheathing with short free acute or acuminate tips. *Spike* short, compact, closely 4-7-flowered. *Bract* oblong, obtuse or acute, 1,4-1,9 cm long, 6-7 mm wide; bracteole similar to bract, sometimes bidentate at the apex. *Flowers*

fairly small, erect, pale salmon-pink to deep golden-red. *Perianth tube* straight or very slightly curved, 3 cm long, widening gradually from 1,5–2 mm diam. at the base to 4–6 mm at the throat; *lobes* equal, all more or less recurved or the dorsal sometimes suberect, oblong, obtuse or subacute, 1,8–2 cm long, 7–9 mm wide. *Stamens* erect, arising about 1,5 cm within the perianth tube and not exerted; filaments 8 mm long; anthers linear, subsagittate, 6–7 mm long, reaching almost to base of lobes. *Ovary* oblong, 3 mm long; style reaching to top of anthers, the branches linear, slightly expanded towards the apex, 4–6 mm long.

Endemic in the Stellenbosch and Somerset West districts of the Cape Province, on rocky ledges on the mountains at 700–1 400 m altitude, flowering from January to March.

CAPE.—Somerset West: Somerset Sneekop, *Valpy* (SAM 54330, 55012). Stellenbosch: Twin Peaks, Jonkershoek, *Borchardt*, Jonkershoek Herb. 109, 238 (BOL, NBG, PRE, SAM 56244, K, BM), *Esterhuysen* 11469 (BOL); upper end of Jonkershoek valley, *Rycroft* 2148 (NBG), *Esterhuysen* 14383 (BOL), *Wicht* (PRE); Simonsberg, *Esterhuysen* 25459 (BOL). Wellington: Wellington, Sneekop, *Marloth* 9497 (PRE).

A striking species distinguished from all others by its short stamens which do not project beyond the throat of the perianth tube. The more or less straight tube and equal lobes are also unusual, although these do occur in a few other species. The specific name was suggested by a resemblance in the compact inflorescence, recurved perianth lobes and colour of the flowers to *Nerine sarniensis*. It is not possible to reproduce the true colour of the flower, which varies from pale salmon-pink tinged with yellow to a rich orange-crimson with an iridescent bloom of gold dust.

COLOUR PLATE 24. G. J. LEWIS. *Flower. Pl. Afr.* t.994 (1946).—1, corm, base of stem, inflorescence; 2, bract; 3, bracteole; 4, flower front view; 5, flower side view; 6, longitudinal section of flower, all natural size; 7, stamen $\times 2$; 8, upper part of style and style branches $\times 3$.

Cape.—Somerset West: Somerset Sneekop, *Valpy* (SAM 54330, 55012). February 1940.

85. **Gladiolus guthriei** Bol.f. in Ann. Bolus Herb. 2 : 101 (1917). Type: Cape, Bredasdorp district, Elim, *Guthrie* 3821 (BOL, holo.).

Corm ovoid or subglobose, 2–4 cm diam., with tunics of coarse wiry brown fibres extending up in a thick neck 6–10 cm long. *Stem* simple, moderately slender, subflexuose, 45–75 cm high, with 2 obtuse hyaline basal sheaths, the outer about 2,5 cm long and inner 6,5–10,5 cm, the latter usually brown at the apex and just showing above the neck fibres. *Basal leaf* probably solitary and produced after the flowering period, the dead remains of 1 or 2 fairly short falcate lanceolate leaves sometimes present with the flower shoots; *cauline leaves* 3 or 4, the lowest 14–34 cm long, with the lower two-thirds closely sheathing, striate, pilose, and a short firm glabrous, lanceolate or lanceolate-

ensiform suberect blade 6–9 mm wide with prominent yellow margins; second similar but the sheath longer and blade shorter, narrower, and without prominent margins; 1 or 2 upper 3,5–11 cm long, the third similar to the second, with a short subulate adpressed blade, and fourth when present short, glabrous and bractlike with little or no sheath. *Spike* secund (rarely more or less equilateral), laxly to fairly closely 3–10-flowered. *Bract* oblong, acute to obtuse, 2–3,5 cm long, 0,7–1 cm wide; bracteole slightly shorter and wider, ovate-oblong, usually minutely bidentate at the apex. *Flowers* small, more or less campanulate, fragrant, deep pink or reddish with darker markings on the lower lobes, somewhat diamond-shaped on the laterals and a median stripe on the lowest or upper lobes greyish mauve or purplish and 3 lower greenish yellow finely spotted and with a median stripe of purple. *Perianth tube* 2–2,5 cm long, curved near the top, the upper part funnel-shaped; *lobes* obtuse, sometimes subtruncate, the dorsal hooded, broadly obovate or suborbicular, 1,9–2,8 cm long, 1,5–2,1 cm wide, and upper laterals obovate or obovate-oblong, 1,5–2,3 cm long, 0,9–1,6 cm wide; 3 lower obovate-oblong or subspathulate, sometimes subunguiculate, 1,5–2 cm long, 0,7–1 cm wide, the lowest usually a little shorter or broader than the laterals, sometimes obovate and up to 1,2 cm wide. *Stamens* arcuate, arising 4–5 mm below top of tube; filaments 1,1–1,4 cm long; anthers linear, subsagittate, 0,7–1 cm long (rarely 0,6). *Ovary* ellipsoid, 4–5 mm long; style reaching nearly to top of anthers or shortly above, with obcordate-spathulate more or less conduplicate branches 3–4 cm long.

Endemic to the southern Cape where it is found on sandy hill slopes in the south of the Bredasdorp district, flowering from May to July.

CAPE.—Bredasdorp: Elim, c. 160 m alt., *Guthrie* 3821 (BOL); hills above Pearly Beach, *Lewis* 2308 (SAM 60883, K, PRE, SAM), *Thomas* (NBG), *Martin* 343 (BOL, NBG); Potberg, *Barker* 4559 (NBG); 7–8 km S. of Papiessvlei, *A. S. Schelpe* 702 (BOL); about 8 km from Bredasdorp on Elim–Streis Bay road, *Van Breda & Admiraal* 1851 (PRE).

G. guthriei was described from a single incomplete dried specimen and most of the measurements given for the flower are a little below the normal average in plants which have since been collected in the same area. It was said to be well marked by the shortly produced leaf with a pilose sheath, and the dorsal perianth lobe being nearly twice as broad as the laterals.

From the evidence of the dead remains of one or two leaves present with the flowering shoot on some of the plants it appears that a single basal leaf is probably produced before or after the flowering period, as in the closely allied *G. odoratus*, but although living plants have been examined they have not been studied in cultivation so no description of this organ can be given.

The species was named in honour of the first collector, Prof. Francis Guthrie, who made many valuable contributions to botany in South Africa and collaborated with Dr H. Bolus in the mammoth task of describing the genus *Erica* for the *Flora Capensis*.

COLOUR PLATE 25. G. J. LEWIS.—1, corm and base of stem; 2, top of flower spike; 3, flower front view; 4, top of style \times 3; 5, front and back view of stamen \times 2; 6, flower laid out; 7, bract; 8, bracteole.

Cape.—Bredasdorp; road to Pearly Beach, *Thomas* (sub 62034 NBG)—May 1962.

86. **Gladiolus carmineus** C. H. Wright in Curtis's bot. Mag. t.8068 (1906); L. Bolus, Barclay & Steer, Second Book S. Afr. Flrs t.149 (1936); Rice & Compton, Wild Flrs Cape of Good Hope t.212 f.2 (1951). Type: Cape, Caledon district, Hermanus cliffs, *Abercrombie Smith* (K, holo.).

Common name: Hermanus Cliff Gladiolus.

Corm subglobose, 2–3 cm diam., with reddish brown submembranous tunics. *Stem* simple, moderately slender, usually flexuose, 16–60 cm high, usually 20–35 cm, with 2 or 3 basal sheaths or prophylls, the 1 or 2 outer hyaline, obtuse, 0.5–3.5 cm long, inner 5.5–12 cm long, brownish or greenish towards the apex, acute or subacute. *Basal leaf* solitary in first year, two in second year, occasionally three, produced after flowering, linear-lanceolate, falcate, decumbent, grasslike, 50–65 cm long, 0.7–1.6 cm wide, glaucous, enclosed at the base in 2 or 3 prophylls similar to those at the base of the spike; cauline leaves usually 3, in taller plants up to 6, 2.8–13 cm long, the 1–2 lower with the lower $\frac{1}{2}$ or $\frac{1}{3}$ sheathing and a short erect subulate acuminate blade often incurred at the apex, the uppermost often with little or no sheath. *Spike* short, more or less second, 2–6-flowered, usually 2–3. *Bract* oblong, acute or acuminate, 3–5.5 cm long, 1.2–1.5 cm wide; bracteole a little shorter than bract, bidentate at the apex. *Flowers* large or fairly large, up to 9 cm across, deep rose pink or carmine, paler outside, with a white or cream median stripe or large somewhat spatulate mark bordered with darker pink or mauve on the lower lobes rarely white (albino). *Perianth tube* straight or slightly curved, 3–4.5 cm long, the upper third funnel-shaped; *lobes* ovate, obovate or broadly elliptic, obtuse or acute, the dorsal slightly hooded, suberect, and others patent, 3.5–5.8 cm long, 1.8–3 cm wide, the 3 upper only slightly larger than 3 lower, sometimes the dorsal a little wider than the laterals. *Stamens* arcuate, arising 0.7–1.4 cm below top of tube; filaments 2–3 cm long; anthers linear, subsagittate, 1–1.4 cm long. *Ovary* ellipsoid, 0.8–1 cm long; style reaching to base or middle of anthers, the branches linear, slightly expanded towards the apex, 1–1.2 cm long. *Capsule* oblongo-ellipsoid, obtuse at the apex, 2 cm long, 1 cm broad, leathery; *seed* somewhat oblong, 8 mm long broadly winged.

Recorded from the southern Cape on sandstone cliffs or low mountain slopes near the coast in the Caledon and Bredasdorp districts, flowering from February to April and with fruit in May.

CAPE.—Bredasdorp: Potberg, *Taylor* 173 (NBG). Caledon: Hermanus cliffs, *Abercrombie Smith* (K), *Garabedian* (SAM 48282), *Stokoe* (SAM 62785), *Sibbett* NBG 655/38 (NBG), *L. Guthrie* (BOL 15126), *Pole Evans* (PRE); Hangklip, *Compton* 22720 (NBG), *Stokoe* (BOL), *Horrocks* (NBG), *Marloth* 8396 (PRE), *Betty's Bay*, *Porter* (NBG).

The large or fairly large somewhat regular open flower, with the dorsal lobe only slightly hooded and raised and other five spreading, as well as the short cauline leaves and long sprawling falcate glaucous basal leaf, which is developed after the flowering period, distinguish this very attractive species.

Marloth observed on a plant growing in his garden that it made one leaf in the first year and two in its second year. It flowered without leaves in the third year, the flowers lasting five days and closing in the evening.

87. **Gladiolus monticola** Lewis in JI S. Afr. Bot. **14** : 85 (1948), Adamson & Salter, Fl. Cape Penins. 258 (1950); Kidd, Wild Flrs Cape Penins. t.11 f.3 (1950) sphalm. '*monticolus*'; R. A. Dyer in Flower. Pl. Afr. **34** : t.1339 (1960). *G. tabularis* sensu Baker, Handbk. Irid. 207 (1892), Fl. Cap. **6** : 144 (1896); sensu Dur. & Schinz, Consp. Fl. Afr. **5** : 255 (1893); L. Bolus, Barclay & Steer, Second Bk S. Afr. Flrs t.159 (1936). Sensu type: Cape, Table Mountain, Pappe (K, lecto., SAM). *G. puniceus* Lam. var., Lam., Encycl. **2** : 727 (1786). Type: Cape, *Sonnerat* (P, holo.).

Common name: Autumn Painted Lady.

Corm subglobose, 1,5–2,5 cm diam., with brown or reddish brown tunics of fine parallel fibres, sometimes matted, usually connate above the middle and extending above in a fibrous neck 2,5–5 cm long. *Stem* slender, simple (very rarely branched), usually somewhat flexuose, 18–70 cm high, normally 35–45 cm, with 2 basal sheaths, the outer hyaline, obtuse, 3,5–7 cm long, inner up to 15 cm, acute or acuminate, usually brown and membranous at apex and minutely hispidulous below. *Basal leaf* solitary, not present at flowering time, linear, 20–55 cm long, 3–4 mm wide, with thickened margins and midrib, pilose; *cauline leaves* usually 2, rarely 1 or 3, 1,5–8 cm long, closely sheathing with very short free acute or acuminate tips. *Spike* secund, somewhat laxly 2–7-flowered, usually 4–6. *Bract* oblong, obtuse or acute, 1,2–2 cm long; bracteole 1–1,5 cm, minutely bidentate. *Flowers* small, long-tubed, cream-coloured usually tinged with pale coral or salmon-pink, dark pink or pinkish brown, the lower half of lower lobes nearly always with a pale yellow blotch or narrow yellow median stripe outlined with red, sometimes in a hastate or W-shaped form. *Perianth tube* slender, 2,5–3,5 cm long, curved near the top, the upper part narrowly funnel-shaped; *lobes* obtuse or subacute, the dorsal hooded with upper half porrect, oblong, 2–2,5 cm long, 0,9–1,4 cm wide, others more or less patent, the upper laterals ovate-oblong, slightly shorter and narrower than dorsal; 3 lower subequal, elliptic, 1,6–2,2 cm long, 5–8 mm wide. *Stamens* arcuate, arising about 5 mm below top of tube; filaments 0,8–1 cm long; anthers linear, subsagittate, 6–7 mm long. *Ovary* ellipsoid, 3–5 mm long; style reaching a little above middle of anthers, with narrow spatulate branches, 2–3 mm long. *Capsule* ellipsoid, 1,2–1,4 cm long.

COLOUR PLATE 26. CYTHNA LETTY. *Flower. Pl. Afr.* t.1339 (1960).—1, corm and flowering plants; 2, longitudinal section of flower $\times 2.5$; 3, top of style $\times 15$; basal (sterile) leaf.

Cape.—Cape Peninsula: top of Table Mtn, *Esterhuysen* (sub 28379 PRE). March 1959.

It is the only species endemic in the Cape Peninsula where it is found on rocky mountain slopes and plateaux from 700 to 1 150 m; it is fairly frequent on Table Mountain and Devil's Peak, but rather rare at lower altitudes above Simonstown, with no records from the mountains in between. Flowering from January to March, rarely in December.

CAPE.—Cape Peninsula: Devil's Peak, *Dod* 928 (BM, BOL, K); Table Mt., *Schenck* 632 (Z), *Bolus* 7057 (BOL, K), *Pappe* (K, SAM), *Zeyher* (SAM 48493), *Krauss* (G), *Dod* 884, (BK, BOL, K), *Salter* 335/4 (BM), *Foley* (SAM 9551), *Marloth* 7386 (PRE), *Andreae* 313 (PRE), *Esterhuysen* 15147 (BM, BOL, K, PRE, S), 15446 (BOL), *Schlechter* 506 (G, LD, P, Z), *Nielsen* 1568 (C), s.n. (C), *Kässner* 106 ex herb. Moss (BM); Window Buttress, *Compton* 13018 (NBG); ledge above Kirstenbosch, *Compton* 8537 (NBG); Lower Plateau, *Pillans* 4068 (PRE); Nursery Gorge, *Barker* 7219 (NBG), *Esterhuysen* 114 (NBG); top of Skeleton Gorge, *Esterhuysen* (SAM 54998), *Taylor* (SAM 68410); top of mountain above Simonstown (Redhill), *Zeyher* (SAM 48494), *Taylor* 1854 (NBG); without precise locality, *Lotsy & Goddijn* 1818 (L).

WITHOUT LOCALITY: *Sonnerat* (herb. Lam., P—type of *G. puniceus* Lam. var.); *Prior* (BM); *Wahlberg* (S); *Roxburgh* (G).

As Lewis was unable to locate the type of *G. tabularis* Eckl. (a *nomen nudum* enumerated by Ecklon in his *Topographisches Verzeichniss*) she assumed that Baker was correct when he described the above 'hysteranthous' species as being identical to Ecklon's plant. However, Ecklon's original specimen has since been located in the Stockholm Herbarium and was sent on loan to the Bolus Herbarium in February 1972, where it was recognized as a depauperate form of *G. carneus*. This is supported by the fact that Zeyher has labelled true *G. monticola* as *G. montanus* Thunb., now tentatively referred to *Tritoniopsis unguicularis* (Lam.) Lewis.

In his *Encyclopaedia* vol. 2 on p. 727 (1786), after describing *G. puniceus*, Lamarck mentions a variety with the tube longer than the spathe. This was identified by Lewis as *G. monticola* Lewis.

88. **Gladiolus maculatus** Sweet, Hort. Brit. ed. 1 : 397 (1827). Type: Curtis's bot. Mag. t.556 (1827).

Corm subglobose or ovoid, 1–2 cm in diam., with dark or reddish brown tunics of fairly soft, more or less connate reticulate fibres. Stem slender, simple, 30–80 cm high, somewhat flexuose above the middle, with 2 or 3 basal sheaths, the lowest 1 or 2 hyaline, truncate, 1–4 cm long, the upper green, obtuse or subacute, up to 15 cm long, gradually changing into cauline sheathing leaves. Basal leaf absent or withered at time of flowering, filiform to compressed-terete, up to 40 cm long, 0.5 mm broad, closely ribbed; cauline leaves 3–4(–5), sheathing $\frac{1}{3}$ – $\frac{3}{4}$ of the stem and with free short linear or subulate blades 2–10 cm long, 1–4 mm wide, firm, closely ribbed, apex involute, subulate. Spike 1–3(–4)–

flowered, lax, secund. *Bract* narrowly lanceolate-acuminate, lowest up to 5 cm long, firm; bracteole somewhat smaller, minutely bifid or bidentate. *Flowers* 5–10 cm long, tubular-campanulate, fragrant, variable in colour, finely streaked and spotted with dark brown, purple or red on a dull yellow, brownish yellow, pink or brown background, or pink or white, with or without spots in the throat, the lower half of the dorsal lobe often partly hyaline; with a strong sweet scent. *Perianth tube* curved, varying in length, lower half slender, upper part funnel-shaped or broadly cylindrical; lobes campanulate, ovate to ovate-acuminate, as long as or somewhat shorter than the tube, the tips often recurved, undulate in ssp. *maculatus*; dorsal lobe largest, obovate, not or slightly hooded, other 5 subequal, the 3 lower connate for about 5 mm. *Stamens* inserted in upper part of tube, anthers linear, subsagittate, 8–10 mm long. *Stigmas* sub-orbicular to oblanceolate.

This well-known Cape species is common on the Peninsula, extending north-westwards to Ceres and south-eastwards along the coastal belt as far as the Albany district. It is fairly frequent, usually on mountain slopes up to 1 000 m altitude. It belongs to the group of autumn flowering species (March–July), which produces a leaf (or leaves) from a separate bud later in the season. The flowers are sweetly scented during the day.

Four subspecies are recognized.

KEY TO SUBSPECIES

Perianth lobes ovate, attenuated into recurved undulate tips which are shorter than the lobes:

Perianth finely streaked and spotted with dark brown, red or purple on a dull yellow background; tube c. 3.5 cm long, expanding gradually into the limb; the lobes tapering to undulate, acuminate tips (a) ssp. *maculatus*

Perianth in various shades of pink, rarely cream or yellow, with some spotting in the throat; tube c. 5 cm long broadly cylindrical in upper half, resembling somewhat the tube of *Homoglossum*; the lobes rounded, acute (b) ssp. *meridionalis*

Perianth white or cream, without or with faint red-brown streaks in the throat; tube 4–5 cm long, narrowly cylindrical; the lobes ovate, acute or acuminate (c) ssp. *eburneus*

Perianth lobes ovate-lanceolate with attenuated, undulate tips about as long as the lobes (d) ssp. *hibernus*

Lewis in her manuscript considered these four closely related taxa to belong to separate species, but the relationship seems too close to uphold them as such.

All four are found in the south-eastern coastal districts from Caledon to Albany, but ssp. *maculatus* extends further west to the Peninsula and the Ceres districts. The undulate pointed shape of its lobes is characteristic of this typical subspecies. Ssp. *meridionalis* bears the largest, usually pink, flowers and like the third subspecies, ssp. *eburneus*, which is usually white in colour, shows little or no spotting. Lastly in ssp. *hibernus* the perianth lobes have become much elongated. Dr T. T. Barnard, who examined various colonies *en route* from Cape Town to Grahamstown in 1968, was the first to point out their very close relationship.

(a) ssp. **maculatus**

G. maculatus Sweet, Hort. Brit. ed. 1 : 397 (1827); Klatt in Linnaea **32** : 708 (1863); Dur. & Schinz, Consp. Fl. Afr. **5** : 220 (1893) excl. syn. *G. tristis* var. Jacq. et *G. suaveolens* var. *longifolius*; Marloth, Fl. S. Afr. 4 : t.48D (1915); L. Bolus, Barclay & Steer's First Book S. Afr. Flrs t.141 (1928), Second Book, t.175 (1936); Lewis in Adamson & Salter, Fl. Cape Penins. 261 (1950); Ingram in Gard. Chron. Ser. 3, **90** : 9 (1931). Type: Curtis's bot. Mag. t.556. *G. versicolor* Andr. var. *tenuior* Ker in Curtis's bot. Mag. t.556 (1802) et in textu *G. versicolor* var. *inaequalis* Ker. *G. suaveolens* Ker, Gen. Irid. 136 (1827); Loudon, Ladies Flow. Gard. Ornam. Bulb. Pl. t.10 (1841) in textu. *G. tristis* var. α , Thunb., Diss. Glad. 8 (1784). Type: Cape, *Thunberg* (UPS 1080). *G. breynianus* Ker, Gen. Irid. 135 (1827). Type: Cape, *Masson* (BM, holo.). *G. versicolor* var. *inaequalis* Ker. l.c. Type: Cape, *Masson* (BM, holo.). *G. versicolor* sensu Eckl., Top. Verz. 39 (1827); non Andr. 1798; sensu Loudon, l.c. (*G. suaveolens* in textu). *G. punctatus* sensu Lam., Illus. **1** : 117 (1791); non Jacq. 1790. *G. punctatus* sensu Eckl., l.c. non Jacq. 1790, nec Thunb. 1800.

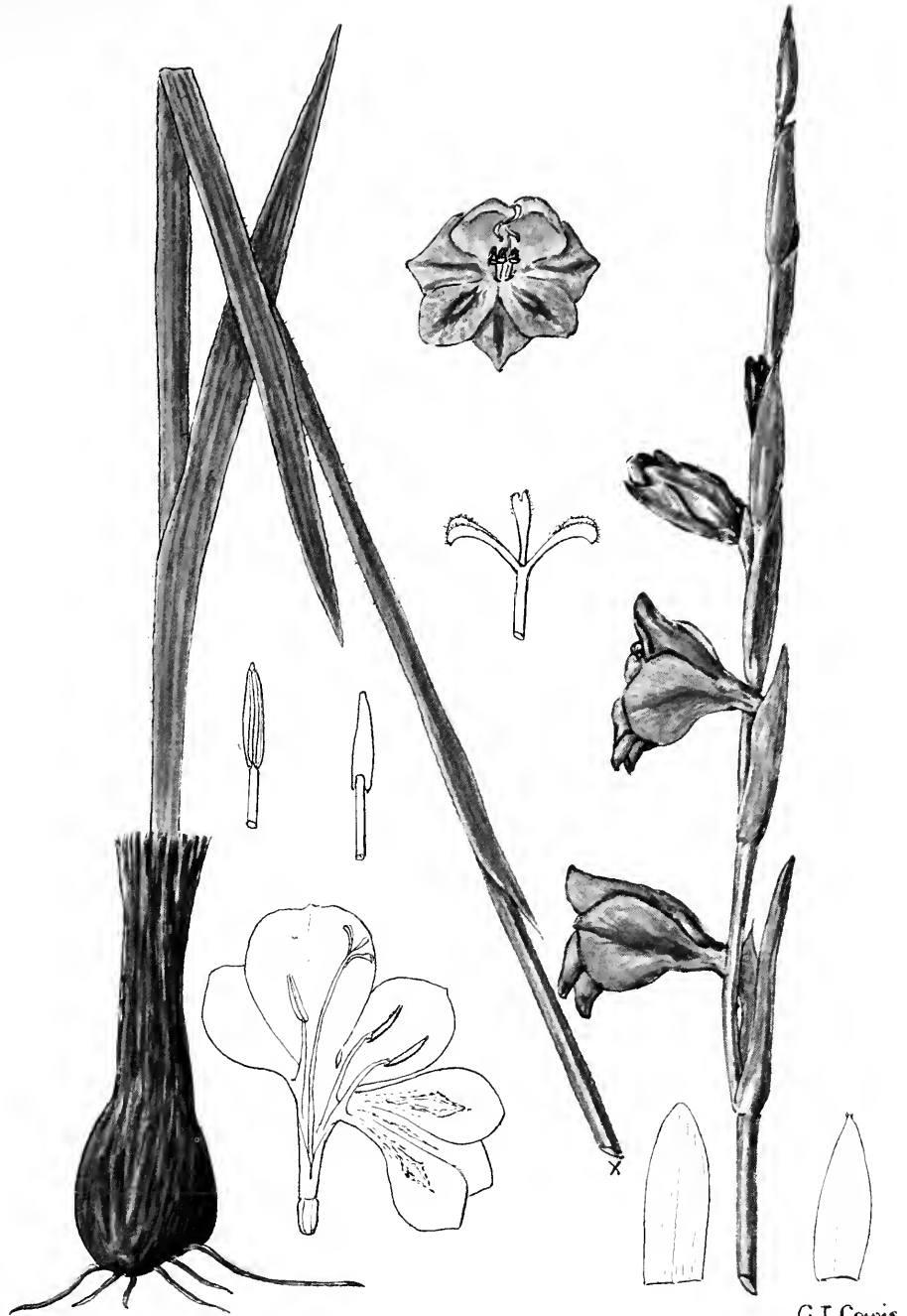
Common name: Brown Afrikaner or Small brown Afrikaner.

The typical subspecies is the well-known maculate taxon common on the Peninsula and spreading north-westwards as far as Ceres; in the south-eastern districts it extends to the Albany district. It is fairly frequent on flats and mountain slopes up to 1 000 m alt. and flowers from March to July.

COLOUR PLATE 27. FAY ANDERSON. *Flower. Pl. Afr.* ined.—Flower spikes; corm, with remains of basal leaf; sketch of plant; young (sterile) basal leaf.

Cape.—Cape Peninsula: Steenberg plateau above dam, *Anderson*. June 1965.

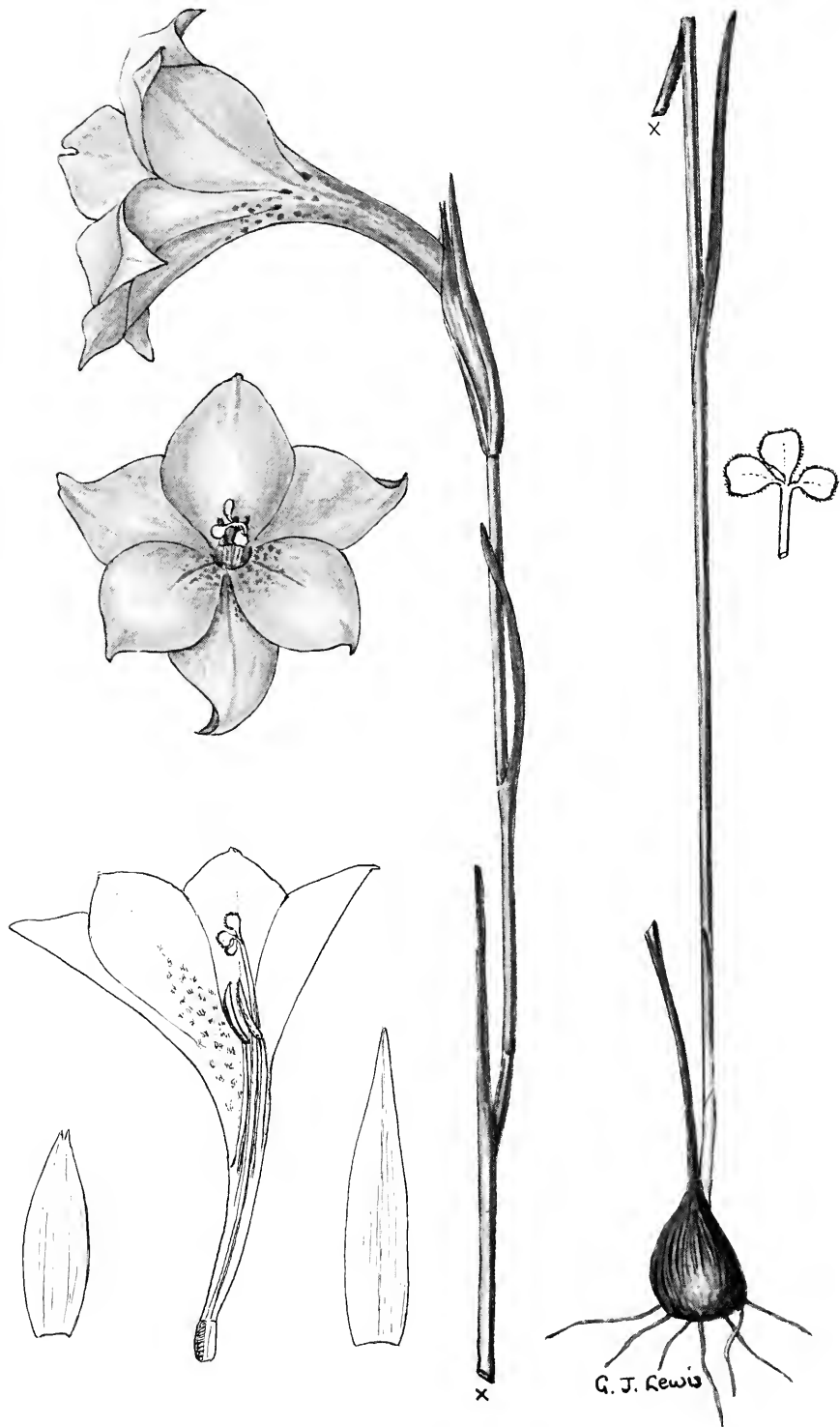
CAPE.—Albany: Collingham Tower, near Grahamstown, *Archibald* (RUH 1340); Governor's Kop, Grahamstown, *Heeg* 77 (RUH); near Grahamstown, *Schlechter* 2651 (PRE, GRA); Signal Hill, *Britten* 5085 (GRA). Bredasdorp: Napier, *Lerm* 9 (NBG); Viljoenshof, *Van Breda & Admiraal* 1864 (PRE). Caledon: between Bot River and Hawston, *Lewis* 6139 (NBG); Eseljag, *Walters* 5 (NBG); Villiersdorp—Bot River road, *Van Niekerk* 728 (BOL); Genadendal, *Pappe* (K), *Schlechter* 7754 (BM, G, GRA, PRE, Z); Riviersonderend Mts, *Stokoe* (SAM 60163); between Riviersonderend and Soetmelsvlei, *Oliver* (NBG); Betty's Bay, *Vogts* 46 (PRE). Cape Peninsula: above Llandudno, *Acocks* 4412 (S); slopes above Camps Bay, *Esterhuysen* 18603 (PRE, BOL); Camps Bay, *Barker* 2422 (NBG), *Cassidy* 195 (NBG); Kloofnek, *Lotsy & Goddijn* 1610 (L); Lion's Head, *Zeyher* (SAM 21269), *MacOwan* 2564, HAA 283 (BM, BOL, G, K, P, SAM, UPS), *Marloth* 78 (PRE); near Cape Town, *Brehm* (BR); Devil's Peak, *Bolus* 4023 (BOL, K), *Krauss* (G), *Thode* A 162 (PRE), *Keet* NBG 1047/37 (NBG); Table Mt., *Pappe* (K), *Moss* 5885 (BM), *Ecklon* (S), *Schlechter* 583 (P), *Verreux* (G), *Trueman* (BM); Table Mt., lower plateau, *L. Bolus* (BOL 14588); mountain slopes above Kirstenbosch, *Esterhuysen* 13914 (BOL); Orange Kloof, *Schlechter* 695 (G, P, Z), *Dod* 2498 (BM); Wynberg Hill, *Esterhuysen* 15460 (BOL); Steenberg crags, *Dod* 1175 (BM, BOL, K); Steenberg, near Muizenberg, *Ecklon* (S); Muizenberg Mt., *Bolus* 4023 (BM, BOL, Z); Redhill, *Jameson* (K); Smitswinkel, *Compton* 17088 (NBG), *Marloth* (PRE), *Salter* 334/10 (BM); Olifantsbos, *Linley* (SAM 59739); Cape Point Reserve, *Barker* 4588 (NBG); Rondebosch, *Rehmann* 1738 (Z); Cape Flats, *Moyle Rogers* (BM); between Cape Town and Simons Bay, *Burchell* 8559 (K, P). Ceres: Wagenboomsrivier, *Zeyher* 3979 (SAM). Humansdorp: near Humansdorp, *Pole Evans* 714 (PRE); 15 km N.N.E. of Humansdorp, *Acocks* 13733 (PRE); Slang River, *Fourcade* 2165 (BOL). Ladismith: Roodeberg, S. slopes, *Esterhuysen* 17199a (BOL). Malmesbury: Riebeeck-Kasteel, *Taylor* 1578 (NBG). Paarl: French Hoek Pass, *Bond* 361 (NBG); Klapmuts, *Loubser* 368 (BOL). Prince Albert: Swartberg, at base of peak, *Pooock* S.229 (PRE). Riversdale: Garcia's Pass, north end, *Barker* 8940 (NBG); Riversdale, *Ferguson* (BOL). Somerset East: Suurberg, *Bayliss* 1262 (NBG). Somerset West: Vergelegen, *Johnson* (NBG); Sir Lowry's Pass, *Guthrie* 2003 (BOL); *De Jongh* in herb. Galpin 3519 (PRE, GRA). Stellenbosch: foot of Stellenbosch Mt., *Pahl* (NBG); Stellenbosch, *Ecklon & Zeyher* 163 (G, SAM), *Duthie* 526 (BOL, K); mountains near Grietjiesgat, *Ecklon & Zeyher* 56.6 (BR, C, K, L, LD, PRE, UPS, Z).



G.J. Lewis.







WITHOUT LOCALITY: Masson (BM—type of *G. breynianus*); herb. Jussieu 3644 (P); herb. Lamarck (P); Martin (G); Thunberg (LD, S, UPS—sheet 1080 in herb. Thunb.); Brehm 179 (M); Pappe (K, S); Bowie 8 (BM); Harvey 65 (BM); Ecklon (AMD); Buek (L); Roxburgh (G); Schinz (Z); Prior (Z); Mund (CGE).

Although the name *G. maculatus* dates back only to 1827, this species was known to botanists long before then, and like many of the commoner species introduced into Europe during the eighteenth century its nomenclature is decidedly involved. As far as is known it was first described and illustrated by Breynius in 1739 (*Prodr. Pl. Afr.* 2, p. 20, t.7 f.1). In this distinctly crude old figure the stem and leaves are shown very much stouter than normal, and the flower is depicted with a long lower lip projecting far beyond the upper, but nevertheless the description of the colour, and the markings and appearance of the flower, leave little doubt as to its identity.

Ker, in his *Genera Iridearum*, published in 1827, named the species *G. breynianus*, citing Breynius's figure and a specimen of Masson's in the Banks Herbarium named *G. tristis minor* Soland. (an unpublished name), and gave as a synonym *G. versicolor* var. *inaequalis* Ker. This varietal name was published in 1802 under t.556 in *Curtis's Botanical Magazine*, where Ker described four varieties of *G. versicolor* (i.e. *G. liliaceus*). The plant illustrated there he named *G. versicolor* var. *tenuior*, and in 1827 he also raised this to specific status and named it *G. suaveolens*.

On examination of Ker's type of *G. breynianus* in the Banks collection in the British Museum it was found to be conspecific with *G. suaveolens*, so that these two names published by him in 1827 apply to one and the same species. However, also in 1827, a third name was published for this species, viz. *G. maculatus* Sweet, also based on t.556 in *Curtis's Botanical Magazine* of 1802. The question of more precise dates for Ker's and Sweet's publications is therefore important, but whereas it has not been possible to ascertain the month in which Ker's *Genera Iridearum* was published, it is known that the first edition of Sweet's *Hortus Britannicus* was in circulation very early in 1827, or even at the end of 1826, so that unless evidence to the contrary can be produced, it is assumed that Sweet's publication has priority.

Further confusion with regard to the identity and nomenclature of this plant was caused by other botanists. In 1784 Thunberg placed it as one of several varieties, var. α of *G. tristis* (*Diss. Glad.* 8), and there is a specimen on sheet 1080 in his herbarium. Lamarck's very brief description of *G. punctatus* in his *Illustrations des Genres* of 1791 probably applies to this species (see note under *G. gracilis*), but as the name was used for another species by Jacquin the previous year, it is not available for this. Ecklon, in his *Topographisches Verzeichniss* of 1827, listed specimens belonging to this species under two names, *G. versicolor* Eckl.—possibly an error and *G. versicolor* Andr. was intended—and *G. punctatus* Thunb., the latter a misidentification as the collections cited and distributed by Ecklon with this name are all *G. maculatus* and bear no resemblance to *G. punctatus* sensu Thunb. which is a variety of *G. carinatus* Ait. In the *Flora Capensis* Baker placed *G. maculatus* as a synonym of *G. recurvus* L. but

the plant he described under the latter name is *G. carinatus*.

The flowers of *G. maculatus* are very sweetly scented and variable in colour, as described above, but the typical form in the south-western districts of the Cape has very marked spotting of a darker shade on a paler ground colour, and usually the base of the dorsal lobe more or less translucent.

Hybrids between *G. maculatus* and *Homoglossum priorii* have been recorded from the Cape Peninsula where both have the same flowering time and occur together on some of the mountains.

(b) ssp. **meridionalis** (Lewis) Oberm., stat. nov.

G. meridionalis Lewis in Ann. S. Afr. Mus. **40** : 127 (1954). Type: Cape, Caledon district, southern slopes of mountains near Danger Point, *Linley* (SAM 60214, hol., K).

This subspecies has larger flowers, usually in various shades of pink, rarely cream or yellow, the lower lobes mottled with crimson near the base. The perianth-tube is 4–5 cm long and usually fairly wide in the upper cylindrical part, as in *Homoglossum*; the lobes are all patent, obovate with obtuse or acute, apiculate tips.

It is found in the south eastern districts from Caledon to Port Elizabeth, where it is occasional in sandy soil on flats, or southern slopes of hills and mountains in the south. It flowers from April to June, occasionally as early as March.

COLOUR PLATE 28. G. J. LEWIS.—1, flower spike; 2, corm and stem; 3, flower front view; 4, longitudinal section of flower; 5, bracteole; 6, bract; 7, top of style $\times 2$.

Cape.—Bredasdorp: near Danger Point, *Linley* (sub SAM 60214). April 1948.

CAPE.—Bredasdorp: hills above Pearly Beach, between Danger Point and Quoin Point, *Lewis* 2307 (SAM 60882, PRE, SAM), *Martin* 339, 365 (NBG); between Pearly Beach and Stanford, *Martin* 346 (NBG); between Paviesvlei and Elim, *Williams* (NBG); near Bredasdorp, *Judd* (BOL, SAM); Elim, *Schlechter* 7613 (K). Caledon: southern slopes of mountains near Danger Point, *Linley* (SAM 60214, K). Port Elizabeth: Bethelsdorp, *Hayes* (BOL 25785), *Crump* (NBG); Mount Road Township, *Urton* 367 (GRA, SAM); Kraggakama, *Long* 557 (K); Walmer, *Paterson* 1038 (PRE, GRA).

When *G. meridionalis* was first described in 1954 it was thought to be confined to a small area near the coast in the Caledon and Bredasdorp districts. Since then it has been recorded from the Port Elizabeth district as well, and the following note on *Urton* 367 is of some interest: 'This has been an exceptionally good year for this species (i.e. 1956). We have found it—presumably all the same species—in a number of widespread localities around Port Elizabeth and the colour variation is most interesting. Around Kabega and Kraggakama where it is most abundant you find all the colour variations from pure lemon through salmon to deep reddish pink all growing in proximity, while at Theescombe and Van Stadens we've found only the lemon one, sometimes with pink markings in the throat.'

(c) ssp. **eburneus** Oberm., ssp. nov., a ssp. *maculato* perianthio albo, tubo longiore tenui, lobis non undulatis nec recurvatis differt.

Type: Cape, Alexandria district, Alexandria, *Galpin* sub BOL, 19568 (BOL, holo., K) = *Galpin* 10681 (PRE).

This subspecies forms a fairly long, thin perianth tube and is white or cream-coloured, usually with faint red-brown streaks in the throat.

The distribution is from George to Albany and Bathurst in the eastern Cape, where it is occasional on grassy flats and hills, flowering from March to May.

FIG. 46. From a painting by W. F. Barker.—Sketch of corm and sterile basal leaf, reduced; corm; top of inflorescence; 1, flower front view; 2, side view of flower; 3, longitudinal section of flower; 4, dorsal lobe; 5, bottom outer lobe; 6, inner lower lobe; 7, upper lateral lobe; 8, stamen $\times 3$; 9, top of style and stigmas, $\times 3$; 10, bract; 11, bracteole.

Cape.—Alexandria, *Galpin* (BOL 19568) ex hort. May 1932.

CAPE.—Albany: near Grahamstown, *Galpin* 10681 (K, UPS), *Britten* 7073 (BOL), *Rogers* 1082 (Z); near Grahamstown on Cradock road, *Leipoldt* (BOL); without precise locality, *Cooper* 3190 (K, Z); Brak Kloof, *White* 80, (PRE). Alexandria: between Whitney and Alexandria, *Holland* 3827 (BOL); Olifantshoek, *Pappe* (BM, K, SAM 21119); Alexandria, *Galpin* sub BOL 19568 (BOL, K) 10681 (PRE); 2.5 km out on Grahamstown road, *Galpin*, BOL 19560 (BOL, K). Bathurst: Kowie, *Tyson* 185 (PRE), s.n. (GRA); near Hayes Siding on Kowie road, *Britten* 5923 (GRA). Caledon: Genadendal, *Schlechter* 7754 (PRE). George: near George, *Schlechter* 2402 (Z). Port Elizabeth: Bethelsdorp, *L. Bolus* (BOL). Uitenhage: Uitenhage, *Denman* 70 (GRA).

(d) ssp. **hibernus** (Ingram) Oberm., stat. nov.

G. hibernus Ingram in Gard. Chron. ser. 3, **90** : 9 (1931). Type: Illustration by Ingram (BM). No specimen preserved. Cultivated by Ingram in England and said to have been collected near Sir Lowry's Pass in the Cape. *G. vaginatus* Bol. f. var. *fergusoniae* L. Bol. in S. Afr. Gdng Ctry Life **19** : 215 (1929) cum fig. Type: Cape, Riversdale district, Still Bay, *Ferguson* s.n. (BOL 18922, holo.).

This subspecies is characterized by the elongated tips of the perianth lobes. Correlated with this is the shape of the bracts, which are also long attenuate. The flower is fragrant with a Freesia-like scent and the colour has been described as pale mauve, grey mauve or creamy white, densely speckled with purplish or maroon dots which run into short longitudinal lines on the 3 lower and usually the upper lateral lobes and with a faint yellow tinge on the 3 lower and sometimes a darker medial line on 3 upper and lowest lobe.

The pale mauve colour of the flower studied by Ingram suggested to him affinity to *G. recurvus*, but the corm tunics are not hard and clawed as in that species, but soft and fibrous as in typical *G. maculatus*. In the *Gardener's Chronicle* l.c. the illustration of this species was transposed with that of *G. modestus* (= *G. recurvus* L.).

Recorded from the southern Cape districts of Bredasdorp, Swellendam and Riversdale where it is occasional on sandy flats or hills near the coast, flowering May–June.

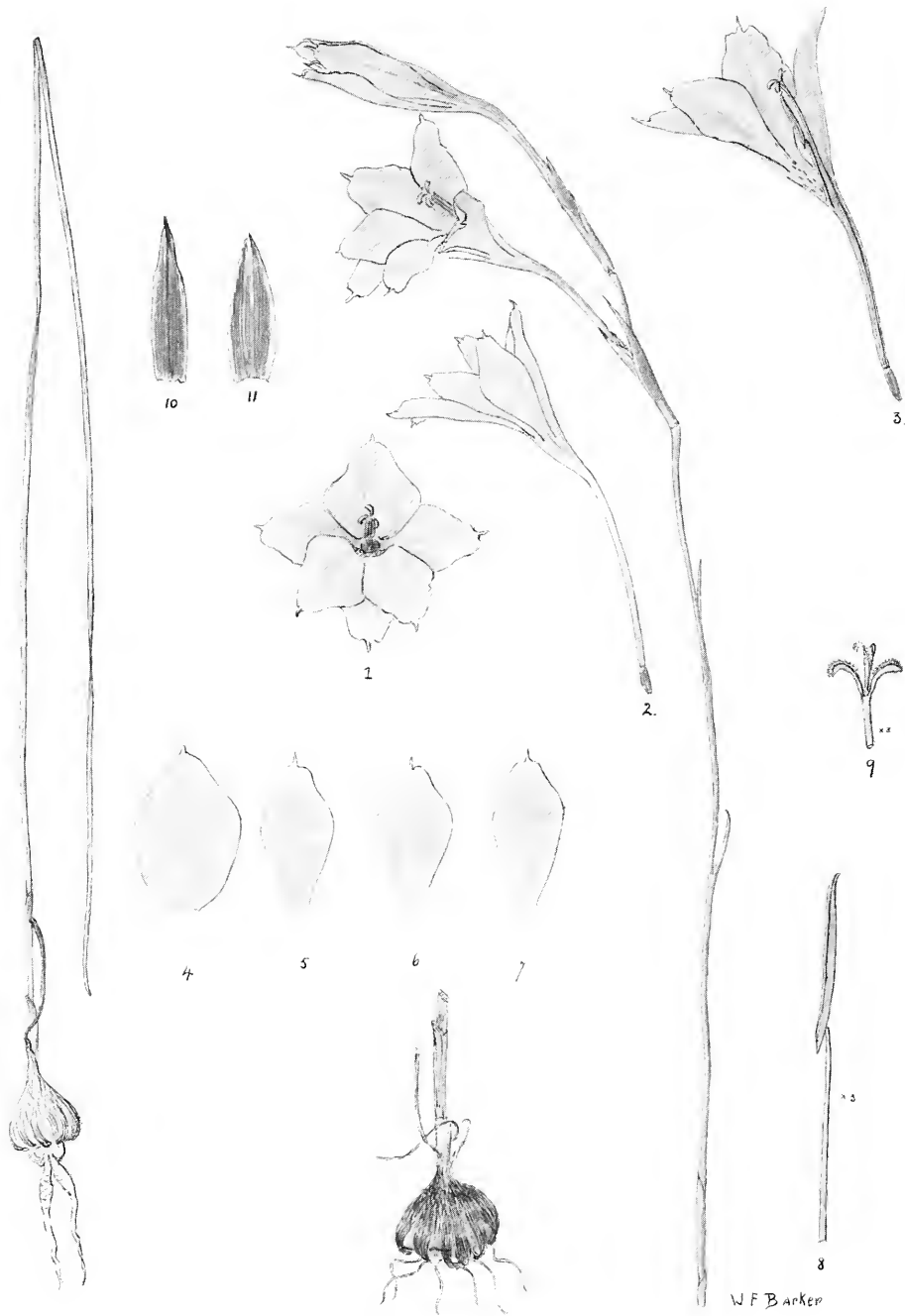


FIG. 46. *G. maculatus* subsp. *eburneus*.



FIG. 47. *G. maculatus* subspecies *hibernus*.

FIG. 47. From a painting by G. J. Lewis.—Corm and basal leaf; inflorescence; flower front view; flower laid out; bract and bracteole.

Cape.—Bredasdorp, Hasiesdrift, *Lewis* 6148 (NBG) ex hort. Kirstenbosch. June 1963.

CAPE.—Bredasdorp: Haasiesdrift, between Swellendam and Bredasdorp, *Lewis* 6148 (NBG). Riversdale: Stull Bay, *Ferguson* (BOL 18922—type of *G. vaginatus* var. *fergusoniae*); Oudeland Farm, *Rust* (NBG); Meikhoufontein, *Muir* 177 (PRE). Swellendam: Bonnievale, *Marloth* 11935 (PRE); Drew, foot of Langeberg, *Kennedy* (PRE).

89. **Gladiolus engysiphon** Lewis, sp. nov., *G. leptosiphoni* affinis sed folio hysterantho unico, florescentia Martio differt. (See fig. 48.)

Cormus subglobosus c.1,5 cm diam. tunics fibrosis in collum 3–4 cm productis. *Caulis* gracilis erectus vel subflexuosus simplex 50–60 cm altus. *Folium* basale unicum hysteranthum subteretum sulcatum 24–27 cm longum 0,5 mm latum; folia caulina 2–3 vaginantia apicibus libris setaceis. *Spica* secunda 3–6 flora. *Bractea* lineari-oblonga acuta vel acuminata c.2 cm longa. *Flores* parvi longitubati bilabiati albi rubrocostati; perianthii tubus angustior cylindraceus 4–5 cm longus gracillimus plerumque parvum curvatus: lobi plus minusve similes c.1,5 cm longi sed lobis inferioribus minoribus, lanceolati acuti vel acuminati. *Capsula* anguste oblongo-globosa 1 cm longa, semina 4 mm longa late alata.

Type: Cape, Riversdale district, foothills of Langeberg, Vette River, *Ferguson* sub NBG 481/34 (BOL, holo., PRE). (See fig. 48.)

Well distinguished by its small flowers with a long slender tube and very narrow acute or acuminate lower perianth-lobes.

Corm subglobose, about 1,5 cm diam., with tunics of fairly fine brown or reddish brown parallel fibres, more or less connate and subreticulate in upper half, extending up in a neck 3–4 cm long. *Stem* slender, simple, straight or subflexuose, 50–60 cm high, enclosed at the base in 2 sheaths, the outer 3,5–4,5 cm long, hyaline, truncate, the inner 8–10 cm long, acute, brown at the apex, greenish, faintly striate and minutely hispidulous below. *Basal leaf* produced separately, 24–27 cm long, 0,5 mm wide, appearing subterete and sulcate with very prominent margins and midrib, glabrous or minutely hispidulous at the grooves, enclosed at the base in 2 sheaths like those at the base of the stem; *cauline leaves* 2 or 3, closely sheathing with short free setaceous tips, the lowest up to 35 cm long, striate, glabrous or minutely hispidulous on the nerves, the others up to 13 and 3 cm long. *Spike* secund, fairly closely 3–6-flowered. *Bract* linear-oblong or oblong-lanceolate, acute or acuminate, 2,4–1,5 cm long, 3–4 mm wide; bracteole like bract but slightly shorter and bidentate at the apex. *Flowers* small, long-tubed, white with a crimson median line on the 3 lower and upper lateral lobes, or the lines on the lower lateral lobes expanded to form lanceolate to almost hastate marks, strongly and sweetly scented. *Perianth tube* 4,5–5 cm long, very slender, usually slightly curved, cylindrical, becoming slightly widened towards the throat; *lobes* bilabiate, the



FIG. 48. Type of *G. engysiphon* Lewis (Ferguson, BOL).

Photo: National Herbarium, Pretoria.

3 upper elliptic, acute, and 3 lower much smaller, more or less lanceolate, acute or acuminate; dorsal lobe suberect, slightly hooded, 1,8 cm long, 1,2 cm wide, and upper laterals patent with recurved tips, 1,6 cm long, 7 mm wide; 3 lower subequal, 1,2–1,5 cm long, 2–4 mm wide, connate for 2 or 3 mm at the base. *Stamens* arcuate, arising 5–7 mm below top of tube; filaments about 1 cm long; anthers purple, linear, subsagittate, apiculate, 6–7 mm long. *Ovary* ellipsoid, 4–5 mm long; style reaching top of anthers or shortly above with spathulate branches 3–4 mm long. *Capsule* somewhat narrowly cylindrical, 1 cm long, membranous; *seeds* rounded, 5 mm with a broad circular wing.

Collected in the Riversdale district by Mrs E. Ferguson in March 1934 and recently again by Barnard & Thomas (in seed, April 1970) at the same locality.

The specific name, derived from the Greek *enguos* = narrow, and *siphon* = tube, refers to the long slender perianth tube which, together with the narrow lower lobes of the flower, distinguishes this species from all others in the group of small autumn-flowering species, showing affinity to *G. monticola*.

The description of the basal leaf is drawn from two which are mixed with nine flowering shoots mounted on two sheets in the Bolus Herbarium, and appear to be immature. They continue to grow after the flowering season and are not fully developed until several weeks later, as is usual in this group.

90. **Gladiolus bilineatus** Lewis, sp. nov., *G. angusto* affinis sed perianthii lobis minoribus bilineatis, folio basali unico hysterantho, florescentia Martio differt.

Cormus ovoideus 1–2 cm diam. in collo fibroso 2–6 cm longo elongatus. *Caulis* gracilis flexuosus 25–40 cm altus. *Folium* basale unicum hysteranthum vel interdum synanthum sed ab gemma separata productum, lanceolatum vel lineari-lanceolatum ad 25 cm longum 4–6 mm latum convolutum; folia caulina 2–3 vaginantia superiora breviora reducta. *Spica* secunda laxa 2–4 flora. *Bractee* lanceolatae vel oblongo-acuminatae 3,3–6 cm longae. *Flos* longitubulosus parvus albidus vel cremeus roseo- vel rubro-suffusus; lobi inferiores bilineati; tubus paulum curvatus 4,5–5 cm longus apicem versus leviter dilatatus; lobi acuti; lobus dorsalis cucullatus 2–2,4 cm longus 1,2–1,5 cm latus lobis inferioribus patentibus.

Type: Cape, Riversdale district, foothills of Langeberg, *Ferguson* (BOL 21323, hol., K, SAM).

Corm ovoid, 1–2 cm diam., with tunics of fine, brown, partly corbate fibres, extending up in a neck 2–6 cm long. *Stem* slender, simple, flexuose, 25–40 cm long, with 2 basal sheaths, the outer hyaline, 2,5–5,5 cm long, obtuse or sub-obtuse; inner up to 10,5 cm long, acute, usually mucronulate, brown at apex. *Basal leaf* solitary sometimes present at same time as flowering shoot but arising from a separate bud, lanceolate or linear-lanceolate, up to 25 cm long, 4–6 mm wide, spirally twisted, few-veined, the midrib slightly prominent; *cauline leaves* 2–3, the lowest 15–31 cm long, half sheathing with a lanceolate or linear-





lanceolate blade 2.5–5 mm wide; 1 or 2 upper 3–10.5 cm long, with short free adpressed subulate tips. *Spike* secund, lax, 2–4-flowered. *Bract* lanceolate to oblong, acuminate to obtuse, 3.3–6 cm long, sometimes suffused with dull red; bracteole hidden by bract, 2.8–3.8 cm long, minutely bidentate. *Flowers* long-tubed, small, white or cream faintly flushed with pink or pale red, the 3 lower lobes with 2 fine pink parallel median lines reaching nearly to the tips. *Perianth tube* curved, 4.5–5 cm long, widening gradually upwards, 7–8 mm diam. at throat; *lobes* acute, the dorsal hooded, ovate, 2–2.4 cm long, 1.2–1.5 cm wide; upper laterals patent with upper half reflexed, oblong-ovate, 1.7–2.2 cm long, 8–9 mm wide; 3 lower patent, connate for 2–3 mm, the laterals ovate-oblong or elliptic, 1.4–1.8 cm long, 6–8 mm wide, and lowest slightly longer and narrower. *Stamens* arcuate, arising 1.3–1.5 cm below top of tube; filaments 2.2 cm long; anthers linear, 8–9 mm long. *Ovary* ellipsoid 5–8 mm long; style reaching above middle of anthers, sometimes to the top, with spatulate branches 3–5 mm long.

Occasional on low slopes of the Langeberg in the south-eastern Cape, flowering from March to April.

CAPE.—Riversdale: Lower slopes of Langeberg, Muir 2515 (BOL); foothills of mountain, Ferguson sub BOL 21323 (BOL, K, SAM). Swellendam: foot of 10 o'Clock Mt., Wurts 10 (NBG); foothills of Langeberg, Wurts 586 (NBG); Swellendam, Thode A 2395 (K, PRE).

The species resembles *G. angustus* L. in its leaf shape, long, narrowly tubular bracts and long narrow-tubed perianth, but the limb is somewhat smaller and the lower lobes bear two parallel stripes. Its solitary basal leaf, although sometimes present at the same time as the flowering shoot, arises from a separate bud and appears not to be fully developed until after the plant has flowered at the beginning of autumn. It appears to have deviated from the *angustus-carneus* group of species to a 'hysteranthous' way of life.

91. ***Gladiolus emiliae*** L. Bolus in J. Bot., Lond. **71** : 124 (1933). Type: Cape; Riversdale district, flats near Riversdale, Ferguson (BOL 19608, holo.).

Corm subglobose, 1.5–2.5 cm diam., with soft submembranous brown or reddish brown tunics of more or less connate fibres, usually a few fine strands extending up in a neck 3–5 cm long. *Stem* fairly slender, simple, usually somewhat flexuose, 20–60 cm high, enclosed at the base in 2 or 3 obtuse sheaths 3–13 cm long, the outer hyaline and inner greenish becoming dark reddish brown towards the apex. *Basal leaf* solitary, not present at flowering time, linear, up to 75 cm long and 1 cm wide, with 3–4 slightly prominent veins and narrow cartilaginous margins, pilose at first but later nearly glabrous, enclosed at the base in 2 sheaths, the outer about 5 cm long, yellowish, and inner up to 14 cm, reddish purple and minutely hispidulous below, the upper half dark reddish brown; *cauline leaves* 2, 3–6 cm long, closely sheathing with short free adpressed acute or acuminate tips. *Spike* secund, usually fairly laxly 3–7-flowered, sometimes to 10 or 12. *Bract* oblong, obtuse or acute, 1.5–2.5 cm

long; bracteole as long as bract or slightly longer, bidentate at the apex. *Flowers* long tubed, smallish, fragrant, densely speckled with red, brown or purplish red on a dull yellow ground. *Perianth tube* 3,3–4,4 cm long, more or less abruptly curved near the top, very slender below and narrowly funnel-shaped above the bend; *lobes* obtuse or subacute, the 3 upper obovate or obovate-oblong, 1,5–2 cm long, 0,8–1 cm wide, the dorsal slightly larger than the laterals; 3 lower 1,2–2 cm long, 5–8 mm wide, subequal, more or less oblong, tapering to the base, or 2 laterals obovate-oblong and wider than the lowest. *Stamens* subarcuate, arising 4–8 mm below top of tube; filaments 0,8–1 cm long; anthers linear, subsagittate, 6–7 mm long. *Ovary* ellipsoid 3–5 mm long; style reaching nearly to top of anthers or a little above, the branches 3–5 mm long, linear with narrow oblong-obcordate stigmas. *Capsule* ellipsoid, 1,8–2,5 cm long, thin-walled with several oblique parallel veins; *seeds* oblong-orbicular, 7–8 mm long, yellow-brown, broadly winged.

In rocky outcrops on sandy flats in the southern Cape, in the Riversdale district and lower slopes of the Riviersonderend and Langeberg mountains from the Caledon to Riversdale districts, flowering from February–April.

CAPE. — Caledon: Riviersonderend mountain range foothills, *Fourie* (NBG). Heidelberg: foot of Lemoenshoek Peak, Langeberg, *Esterhuysen* 14453 (BOL, K, PRE), *Stokoe* (SAM 60155). Riversdale: *Biesiesbaan*, between Albertinia and Riversdale, *Lewis* 5928 (NBG), *Thomas* (NBG); flats near Riversdale, *Ferguson* (BOL 19608, BOL, K); flats, Botteliersfontein, *Muir* 2551 (BOL); kloof E. of Garcia's Pass, 600 m, *Wurts* 1664 (NBG).

WITHOUT LOCALITY: *Roxburgh* (G).

The colour of the flowers and long slender tube, rather abruptly curved near the top, distinguish this species from all others in the group. When it was described in 1933 the basal leaf was not known but descriptions of this organ, and of the capsule and seeds, are now supplied from corms collected in 1962 on a rocky outcrop on sandy flats between Albertinia and Riversdale—possibly the type locality. The corms were grown in the National Botanic Gardens, Kirstenbosch, where each produced a single basal leaf after the flowering period.

The species does not do well in cultivation, and, although a number of corms were planted in the National Botanic Gardens, Kirstenbosch, they produced leaves for a few years but no flowers.

92. **Gladiolus odoratus** L. Bol. in S. Afr. Gdng Ctry Life **17** : 293–4, f.1–2 (1927); Bullock in Curtis's bot. Mag. n.s. 170: t.223 (1954). Type: Cape, Calvinia district, Grasberg near Nieuwoudtville, *Buhr* NBG 460/26 (NBG, holo.).

Corm ovoid or subglobose, 2,5–4 cm diam., with matted tunics of rather soft brown fibres extending up in a thick neck 5,5–10 cm long. *Stem* simple, moderately slender, straight or subflexuose, 30–80 cm high, with 2 basal sheaths, the outer hyaline, obtuse, 5–7,5 cm long, inner 7–14 cm long, obtuse or subacute, dark reddish brown or purplish and membranous at apex,

minutely hispidulous below. *Basal leaf* not present at flowering time, solitary, ensiform or lanceolate-ensiform, 25–65 cm long, 1,2–2 cm wide, spirally twisted, firm with prominent stramineous margins and the midrib and 4–8 other veins slightly to distinctly raised, with 2 or 3 basal sheaths like those at base of stem; cauline leaves 3 (rarely 4), the lowest 13–35 cm long, $\frac{3}{4}$ or more sheathing, striate, occasionally sparsely pilose, with a short suberect lanceolate glabrous blade, firm and more or less spinescent with a few raised veins and prominent yellow margins; second shorter, with a shorter and narrower blade, and uppermost 4,5–13 cm long, up to half sheathing but sometimes not at all, the blade subulate, adpressed to the stem. *Spike* more or less secund, laxly to rather closely 3–13-flowered, usually 5–10. *Bract* oblong, acute to obtuse, 2–4 cm long, 0,8–1 cm wide, often with narrow hyaline margins; bracteole slightly shorter than bract, bidentate at apex. *Flowers* smallish, fragrant, usually speckled and striped with purple, reddish purple, maroon or red on a dull yellow or brownish yellow ground, the dorsal lobe sometimes purplish inside and red outside and other 5 usually yellowish round the margins or towards the apex, with a dark median stripe. *Perianth tube* 2–2,5 cm long, curved near the top, the upper part funnel-shaped; *lobes* with the margins more or less crisped towards the apex, the dorsal hooded, porrect, usually obovate, obtuse or subobtuse, 2–3 cm long, 1,4–1,8 cm wide; other 5 subequal or 2 upper laterals slightly larger than 3 lower, all patent with upper half recurved, obovate-oblong, oblong or elliptic, sometimes distinctly narrowed to the base and subunguiculate, obtuse or acute, 2–3 cm long, 0,7–1,2 cm wide, the 3 lower connate for 3–4 mm at the base. *Stamens* arcuate, arising 5–7 mm below top of tube; filaments 1,2–1,6 cm long; anthers linear, subsagittate, minutely apiculate, 0,8–1,1 cm long. *Ovary* ellipsoid or rotund, 4–5 mm long; style, reaching middle or top of anthers, the branches broadly spatulate, obcordate-spatulate or oblanceolate, more or less conduplicate, 3–5 mm long. *Capsule* oblongo-ellipsoid, 2 cm long, 1 cm broad, apex obtuse, leathery; *seed* rounded oblong, 8 mm long with a broad wing.

Recorded from the western Cape Province, from the tops of the mountains forming the escarpment above Vanrhynsdorp to the Montagu district, usually in rock crevices at altitudes from 300 to 1 000 m, flowering from April to June, occasionally July.

CAPE.—Calvinia: Grasberg, near Nieuwoudtville, *Buhr* NBG 460/26 (BOL); Nieuwoudtville, *Leipoldt* 4245 (BOL, PRE). Clanwilliam: top of Pakhuis Pass, *Salter* 8137 (SAM), *Middlemost* 2083 (NBG); Wuppertal, *Marloth* 7403 (BOL, PRE), 10093 (PRE); Nieuwoudt Pass, *Lewis* 6140 (NBG). Montagu: Koo, lower slopes of Naudesberg, *Lewis* 5689 (NBG). Piketberg: mountain above Porterville, *Loubser* 433 (NBG); Piketberg Mt., 830–1 000 m, *Brink* (NBG), *Ince* (NBG). Vanrhynsdorp: top of Gifberg, *Barker* 10205 (NBG). Worcester: Bain's Kloof, *Barker* 4538 (NBG), *Schelppe* (SAM 67319), *Malan* (BOL); Brandvleikop, 330 m, *Bond* 370 (NBG); foot of Brandvleiberg, *Esterhuysen* 1930 (BOL); Waaihoek Peak, lower W. slopes, *Esterhuysen* 24305 (BOL).

WITHOUT LOCALITY: *Stanford* (K).

When Louisa Bolus described the species she stated that 'in general colouration it recalls *G. maculatus*, being a mixture of reddish purple, brown and dull yellow, and with the same translucent area on the back petal'. As in *G. maculatus*,

the colouring is very variable and it is sweetly scented, but apart from this there is no close affinity. It is very nearly allied to *G. guthriei* and could be confused with it in the dried state, but is distinguished by its glabrous or only occasionally sparsely pilose leaf sheaths, and the set and colouring of the flowers, those of *G. guthriei* being more or less campanulate with the two upper lateral lobes overlapping the dorsal, giving a somewhat orbicular appearance to the flower when viewed from the front, whereas in *G. odoratus* the dorsal lobe is suberect and set a little apart from the other five which are more or less aligned and alike, with the upper half recurved.

G. odoratus has been grown at Kew in recent years and was illustrated in 1954 in *Curtis's Botanical Magazine*, Plate 223 of the new series. Describing the treatment received there Mr A. A. Bullock informs us that they were grown as pot plants in a very sandy compost, and were rested during the late autumn and winter, starting into growth again in the early spring and flowering in late April and May. These are the normal flowering months for the species in its natural habitat in South Africa, but here it is autumn and not spring.

93. **Gladiolus vaginatus** Bolus f. in Ann. Bolus Herb. 2: 103 (1917). Type: Riversdale district, Albertinia, Muir 1287 (BOL, holo.).

Corm globose to ovoid, 1.5–3 cm in diam., with membranous to fibrous, brown tunics, occasionally extending up in a neck. *Stem* slender, simple, straight, 15–70 (–110) cm high, enclosed at the base in 2–3 obtuse sheaths, the outer hyaline, short, inner green up to 16 cm long. *Basal leaf* not present at flowering time, solitary, terete, glabrous, 20–60 cm long, 0.5–1.5 mm in diam., enclosed at the base in 1 or 2 obtuse sheaths 4–8 cm long; *cauline leaves* 2 (rarely 3) entirely sheathing, the lower apiculate, faintly striate, enclosing three-quarters or more of the stem, the second (and third when present) about 2–6 cm long, acute or apiculate. *Spike* secund, 1–9-flowered, usually 2–3 open at the time. *Bract* narrowly oblong, acute, about 15 mm long, 3 mm broad; bracteole like bract but slightly wider. *Flowers* small, fragrant, very pale mauve to grey mauve or grey blue, rarely white, the lower lateral lobes with a pale yellow median stripe or diffused blotch in the lower half surrounded by fine purple streaks and dots or with 3 fine purple lines, the tube yellow-orange inside. *Perianth tube* curved, narrowly funnel-shaped in upper half, 1–2 cm long; *limb* bilabiate, prognathous; lobes elliptic, subacute or acute, 2–3 cm long, 8–12 mm wide, the dorsal slightly wider, hooded; 3 lower connate at the base, shortly clawed. *Stamens* arcuate, arising near the top of the tube shorter than the upper lobes; anthers linear, 5–10 mm long, minutely apiculate, subsagittate. *Ovary* ellipsoid, 4 mm long; style about as long as the stamens. *Capsule* rotund, 1–1.3 cm long, thin walled; *seeds* oblong-orbicular, yellow brown, broadly winged, 5–6 mm long.

The range of this species is from Caledon to Knysna in the southern Cape, where it inhabits sandy flats, coastal dunes, limestone pockets or heavy clay

soil, on the lower slopes of hills and mountains near the coast; it flowers in autumn from February to April.

This species is characterized by its very long sheathing basal cauline leaf and shorter upper one which overlap and entirely enclose and conceal the stem almost to the base of the spike; the specific name refers to this. There is no description of the basal 'hysteranthous' leaf with the original description but corms collected in 1962 near the type locality were grown in the National Botanic Gardens, Kirstenbosch, and produced leaves, one to each plant, after the flowering period, so it is now possible to give particulars of this organ. The very slender terete glabrous leaf is like that of *G. pillansii*, to which *G. vaginatus* is closely allied; the differences between the species are mentioned in a note under *G. pillansii*.

The variety *fergusoniae* placed here by L. Bolus is distinct as the cauline leaves have long free acuminate tips. It is the same as *G. maculatus* Sw. ssp. *hibernus* Ingram.

Two subspecies are recognized.

KEY TO SUBSPECIES

- Spike 2-9-flowered; perianth with the lips close-set; filaments about as long as anthers; corm tunics membranous; Riversdale to Knysna (a) ssp. *vaginatus*
 Spike 1-4-flowered; perianth with the lips widely parted; filaments longer than anthers; corm tunics fibrous; Caledon to Bredasdorp (b) ssp. *subtilis*

(a) ssp. **vaginatus**

G. vaginatus Bolus f. in Ann. Bolus Herb. 2 : 103 (1917). Type: Cape, Riversdale district, Albertinia, Muir 1287 (BOL, holo.).

This subspecies usually bears from 2-9 flowers on a spike; the lips of the perianth are placed fairly close together. It is found further to the east.

FIG. 49. From a painting by G. J. Lewis.—Corm and part of long stem; inflorescence; flower front view; flower laid out; bract and bracteole.

Cape.—Riversdale, west of Albertinia, *Lewis* 5920 (NBG) ex hort. Kirstenbosch. March 1953.

CAPE.—Bredasdorp: Agulhas, limestone pockets, *Jones* (NBG); the Poort, near Bredasdorp, *Barker* 7225 (NBG); 9.5 km W. of Bredasdorp on Elim road, *Lewis* 5953 (NBG). Knysna: northern slopes of Knysna Heads, *Fourcade* 2016 (BOL, GRA); near Buffalo Bay, *Duthie* 836 (BOL); Knysna, *Breyer* (TRV 23360; PRE). Heidelberg: Port Beaufort, dunes near river mouth, *Lewis* 5969 (NBG). Riversdale: Albertinia, *Muir* 1287 (BOL, K); 4-5 km W. of Albertinia, *Lewis* 5920 (NBG), *Acocks* 23618 (PRE); Botteliersfontein, *Muir* s.n. (BOL); Sull Bay, *Muir* 178 (PRE, BOL).

Specimens from around Heidelberg and Bredasdorp are usually somewhat smaller and more slender. The perianth is also slightly smaller with a somewhat longer tube and narrower lobes.

(b) ssp. **subtilis** Oberm., ssp. nov., a ssp. *vaginato* perianthii lobis patentibus inferiore 3-lineato spica 1-4 flora differt.

Type var.: Cape, Bredasdorp, 16 km W. of Elim on Gansbaai road, *Lewis* 5956 (NBG, holo.).



FIG. 49. *G. vaginatus* subspecies *vaginatus*.

Recorded from the Caledon and Bredasdorp districts in the southern Cape in heavy clay on flats, hills and lower mountain slopes; flowering from March to April.

CAPE.—Bredasdorp: 16 km W. of Elim on Gansbaai road, *Lewis* 5956 (NBG); near Bredasdorp, *L. Bolus* (BOL 20474; BOL, K, PRE, SAM); Elim, *Frowein* sub. TRV 1047 (PRE). Caledon: hill near hot spring, *Purcell* 140–142, 161–165, 172 (SAM 46269); Caledon, *Bolus* s.n. (BOL); Swartberg near Sandfontein, *Schlechter* 10355 (BOL, BM, BR, G, GRA, GRO, L, K, P, PRE, Z); near Onrus on Hermanus road, *Pillans* (BOL); about 9 km E. of Caledon on Swellendam road, *Barnard* (BOL); Paardebergpas between Paardeberg and Kleinriviersberg, *Lewis* 5961 (NBG).

A very delicate, sweetly scented subspecies near ssp. *vaginatus* but with different corm tunics, a much more open 2-lipped flower, longer perianth-tube and the filaments about twice as long as the anthers. It somewhat resembles *G. subcaeruleus* but is distinguished by the very much longer lower cauline leaf which sheathes three-quarters or more of the stem, the glabrous basal leaf, and the colour, scent and markings of the flower, which has shorter anthers and the lower lip of the perianth not projecting as much. Schlechter collected both species near Sandfontein and distributed them under the same number (10355). It is possible that Lewis has not identified some of them correctly in a few of the herbaria she visited in Europe as she was not aware at the time that two species were involved.

After a year in cultivation in the National Botanic Gardens, Kirstenbosch, the plants were taller and slightly more robust than when collected in the field, up to 60 cm high, and some of them 4-flowered.

COLOUR PLATE 29. G. J. LEWIS.—1, inflorescence; 2, corms with remains of basal leaf; 3, flower front view; 4, flower laid out; 5, top of style and style branches $\times 2$; 6, stamens $\times 2$; 7, bract; 8, bracteole.

Cape.—Bredasdorp: between Elim and Gansbaai, *Lewis* 5956 (NBG). April 1962.

94. ***Gladiolus brevifolius*** Jacq., Coll. 4 : 156 (1790), Ic. t.249 (1793–94) et Fragm. 3, No. 12, t.2, fig. 3 (1800). Type: Jacquin, Ic. t.249.

Common name: Pypie.

Corm globose, subglobose or ovoid, 1.2–4 cm diam., usually 2–3 cm, with tunics of fine to rather coarse pale or reddish brown fibres, the strands often partly connate above the base and extending up in a thinnish neck 2–6.5 cm long. *Stem* slender, simple, more or less flexuose, 15–65 cm high, average 20–45 cm, with 2 or 3 basal sheaths, the outer 1 or 2 hyaline, truncate to acute, sometimes ferruginous at the apex, 1–7.5 cm long, the inner up to 16 cm long, acute, often ferruginous towards the apex, glabrous or minutely hispidulous below, sometimes obtuse or subobtuse and purplish or occasionally green at the apex. *Basal leaf* rarely present at flowering time, enclosed at the base in 1 or 2 sheaths as at base of stem, solitary, linear or linear-lanceolate, spirally twisted, 30–60 cm long, 2–8 mm wide, more or less pilose, occasionally glabrous, the margins, midrib and sometimes 1–4 other veins slightly to distinctly

prominent; *cauline leaves* 1–3, rarely 4, with short to long internodes between, closely sheathing, 1.5–13 cm long, with free adpressed or incurved tips, usually acuminate and sometimes brown, the lowest leaf occasionally with a linear or lanceolate blade up to 5 cm long, rarely more. *Spike* secund, fairly laxly to closely 3–10-flowered, occasionally up to 14. *Bract* oblong or lanceolate, acuminate, acute or obtuse, 1–2.3 cm long, 5–7 mm wide; bracteole as long as bract or slightly shorter, sometimes minutely bidentate at the apex. *Flowers* small, sometimes scented, very pale to deep pink or mauve-pink, rarely white or mauve, dull greyish yellow or brown, brownish green, or blue-grey and yellow, the lower lobes nearly always marked with pale or bright yellow and deep pink, red or mauve, usually the laterals with a yellow patch or irregular transverse band near the middle outlined with the darker colour, and with streaks or spots below, and the lowest with a short median stripe of the same colouring. *Perianth tube* curved, funnel-shaped, 1–1.5 cm long; *lobes* arranged in 2 lips set fairly close or rather widely apart, the lower sometimes slightly prognathous, obtuse, subobtuse or sometimes acute, the dorsal hooded, sometimes more or less porrect, obovate or obovate-oblong, 2–3 cm long, 1–2 cm wide; upper laterals obovate, oblong or broadly elliptic, 1.7–2.5 cm long, 1–1.6 cm wide; 3 lower more or less recurved, subequal, obovate-oblong or elliptic, usually tapering to the base and sometimes unguiculate, or the laterals subspatulate and lowest slightly larger and elliptic, 1.5–2.6 cm long, 0.5–1 cm wide, connate for 2–3 mm at the base. *Stamens* arcuate, arising 3–5 mm below top of tube; filaments 1.1–1.5 cm long; anthers mauve, linear, subsagittate, 5–7 mm long. *Ovary* ellipsoid or rotund, 3–5 mm long; style reaching to middle or top of anthers, the branches oblanceolate, spatulate or obcordate-spatulate, subconduplicate, 3–4 mm long. *Capsule* ellipsoid, 1.2–1.8 cm long, pale, rather thin-walled, firm; *seeds* oblong-orbicular, broadly winged, pale yellow-brown, 6–8 mm long.

Found in the south-western Cape from Clanwilliam to Bredasdorp; it is the commonest of the small autumn-flowering species, fairly widespread and very variable with a few distinct forms and varieties, fairly frequent on sandy flats, mountain slopes and plateaux up to 1 000 m altitude. It flowers usually from March to May but occasionally also at other times.

Four varieties are recognized.

KEY TO THE VARIETIES

Flowers pale to deep pink or mauve-pink, rarely mauve or white:

Stem usually more than 60 cm high, 12–20-flowered, rarely less; basal leaf 0.7–1.9 cm wide (c) var. *robustus*

Stem usually less than 60 cm high, 3–10-flowered, rarely more; basal leaf 2–8 mm wide:

Flowers not or hardly scented, usually more than 3 cm long including the ovary (a) var. *brevifolius*

Flowers fragrant, very small, usually less than 3 cm long including the ovary (b) var. *minor*

Flowers dull greyish yellow or brown, brownish green or blue-grey and yellow (d) var. *obscurus*

(a) var. **brevifolius**

G. brevifolius Jacq., Coll. **4** : 156 (1790), Ic. t.249 (1793–94), Fragm. 3, no. 12, t.2, fig. 3 (1800); Willd., Sp. Pl. **1** : 213 (1797); Thunb., Prodr. 184 (1800), Fl. Cap. **1** : 177 (1811), Fl. Cap. ed. Schult. 42 (1823); Pers., Syn. **1** : 43 (1805); Vahl, Enum. **2** : 80 (1806); Ait. f., Hort. Kew. ed. 2, **1** : 98 (1810); Ker, Irid. Gen. 134 (1827); Eckl., Top. Verz. 38 (1827); Klatt in Linnaea **32** : 703 (1863); Bak., Handb. Irid. 206 (1892), Fl. Cap. **6** : 143 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 214 (1893); Lewis in Adams. & Salter, Fl. Cape Penins. 258 (1950); Kidd, Wild Flow. Cape Penins. t.10 f.1 (1950); Rice & Compton, Wild Flrs Cape Good Hope, t.207 f.3 (1951). Type: Jacquin, Ic. t.249.

G. tristis, (i) *aphyllus* Thunb., Diss. 8 (1784). *G. hirsutus* Jacq. var. *aphyllus* (Thunb.) Ker in Curtis's bot. Mag. sub t.727 (1804), t.992 (1807), Bot. Reg. 7, append. *G. aphyllus* (Thunb.) Ker, Irid. Gen. 134 (1827). Type: Cape, *Thunberg* 1010 (UPS, holo.). *G. tristis* (k) *ruber* Thunb., Diss. 8 (1784). Type: var. Cape, *Thunberg* 1011 (UPS). *G. carneus* sensu Andr. in Bot. Rep. t.240 (1802); non Delar. 1766. *G. andrewsii* Klatt in Abh. Naturf. Ges. Halle **12** : 339 et Ergänzt. 5 (1882); Dur. & Schinz, Consp. Fl. Afr. **5** : 214 (1893). Type: Bot. Rep. t.240. *G. hirsutus* Jacq. var. *brevifolius* (Jacq.) Ker in Curtis's bot. Mag. sub t.574 (1802), t.727 (1804), exclud. syn. *villosiusculus*, etc. *G. brevicollis* Klatt in Abh. Nat. Ges. Halle **12** : 339 et Ergänzt. 5 (1882); Dur. & Schinz, l.c. 214. Type: Curtis's bot. Mag. t.727. *G. orobanche* A.DC. in Red., Lil. t.125 (1805); Dur. & Schinz, l.c. 222. *G. brevifolius* Jacq. var. *orobanche* (Red.) Bak. in J. Linn. Soc. **16** : 174 (1877). Type: Red., Lil. t.125. *G. amoenus* herb. Banks ex Roem. & Schult., Syst. **1** : 409 (1817). Type: Willdenow 926 (B), herb. Banks (BM). *G. festivus* herb. in Bot. Reg. 30, Misc. 89 (1844). Dur. & Schinz, l.c. 217. Type: Cape, ex hort. Kew (BM). *G. spilanthes* Spreng. ex Klatt in Linnaea **32** : 711 (1863), nom. confus. being based on a collection by Zeyher, which represents *G. gracilis* Jacq. and Andrews' Botanists Repository t.240, which is *G. brevifolius* Jacq.

This typical variety is the most common, widespread and variable. It is frequent on the Cape Peninsula, especially from Kirstenbosch southwards, and in this area the flowers are more widely open, with the dorsal lobe more porrect, than in some of the forms which occur in other districts. In the Caledon and Bredasdorp districts the plants are generally smaller, with the dorsal lobe smaller and more arched. Near the coast in the Caledon district, between Hangklip and Kleinmond, there is an early flowering form (January) with more distinctly unguiculate lobes and the inner sheath at the base of the stem markedly hispidulous. The plant figured here occurs on the eastern side of the Cape Peninsula from Kirstenbosch to Constantia Nek. It has pale flowers with faint markings on the lower lobes and the mature basal leaf is sometimes glabrous, although young leaves arising from cormels produced by the same plant are pilose.

The normal flowering period is March to May but odd plants are sometimes found flowering out of season from November to February or June to August, partly due to seasonal climatic variations and partly to disturbances such as veld fires. It has been observed that in plants flowering later than usual the lowest cauline leaf sometimes produces a short blade, up to 5 cm long or rarely up to 12 cm, 2.5–5 mm wide, which is very seldom present in earlier flowering plants, and that those very occasionally flowering in the spring may have the basal leaf present with the flowering shoot, but produced from a separate bud, as shown in the plant figured by Andrews (*Bot. Rep.* t.240) which flowered in England in May.

COLOUR PLATE 30. FAY ANDERSON. *Flower. Pl. Afr.* ined.—Flower spikes, two forms; corm; young leaf; longitudinal section of flower.

Cape.—Cape Peninsula: slopes above Constantia Nek (both forms), leg. *Fay Anderson*, STE 29978 (PRE). April 1965.

CAPE.—Bellville: Melkbosstrand road, *Barnard* (BOL); Hercules Pillar, lower W. slopes, *Pillans* (BOL 25787); N.E. of Kanonberg, *Acocks* 4361 (S). Bredasdorp: Strandkloof, near Danger Point, *Lewis* 2311 (SAM), *Compton* 21948 (NBG); Pearly Beach, *Lewis* 5957 (NBG). Caledon: Sir Lowry's Pass, near Steenbras, *Stokoe* (SAM 60157); Betty's Bay, *Rycroft* 2262 (NBG); Palmiet River mouth, *Compton* 6097 (NBG), *Esterhuysen* 12591 (BOL); near Kleinmond, *L. Guthrie* (BOL); 2 km E. of Stanford, *Lewis* 5958 (NBG); Paardebergpas, between Paardeberg and Kleinriviersberge, *Lewis* 5959 (NBG). Cape Peninsula: Little Lion's Head, above Llandudno, *Acocks* 4383 (S) Camps Bay, *Cassidy* 156 (NBG); Signal Hill, *Guthrie* (BOL); near Cape Town, *Ecklon & Zeyher* 287 (S), *Burchell* 908 (K); Devil's Peak and Lion's Head, *Zeyher* 1627 (b) (K, G, P, S, SAM, Z); Devil's Peak, *MacOwan* HNAA 947 (BOL, BM, G, K, P, SAM, UPS), *Tyson* 2494 (SAM), *Bolus* 4652 (BOL, K), *Krauss* (Z); Lion's Head, *Drège* 28 (P), *Prior* (K); Lion's Back, *Salter* 335/2 (K), *Ecklon* 317 (S); Kirstenbosch, *Esterhuysen* 128 (NBG), 16949 (BOL, PRE), *Barker* 2397 (NBG), *Mathews* s.n. (BOL), *Salter* 9449 (BM); Table Mt., *Ecklon* 98 (G, K, OXF, P, PRE, S), s.n. *Ecklon* (S), *Drège* (G, K, P, S), *Pillans* 10483 (BR), *Lotsy & Goddijn* 1923 (L), *Ecklon & Zeyher* 143 (G, K), 144 (G, B, K, LD); flats near Claremont, *Dod* 929 (BM, K), *Schlechter* 706 (Z); Orange Kloof, *Dod* 2443 (BOL), 2497 (K, BOL); Wynberg, *Burchell* 877 (K); Constantia Nek, *Barnard* s.n. (NBG); Constantia, *Zeyher* (C), *Ecklon & Zeyher* (PRE); Constantiaberg, *Barker* 689 (NBG); Vlakkenberg, *Schlechter* 439 (BM, BOL, G, LD, P, Z); Tierbos, Hout Bay, *Acocks* 4355 (S); Steenberg Plateau, *L. Bolus* (BOL 14543); Fish Hock, *Peers* (K); Kalk Bay Hills, *Dod* 970 (BOL, K); Tokai Flats, *Dod* 2634 (BM); Kommetjie, *Lewis* 1841 (SAM), *Thomas* (NBG); near Simonstown, *Bolus* 4652 (BOL, BM) *Jameson* (K), *Anderson* (S); between Witsands and Redhill, *Lewis* 4721 (SAM); Klawer valley, *Salter* 335/2 (BM), *Barker* 307 (NBG); Redhill, *Jameson* (K); Schuster's Kraal (Scarborough), *Barker* 3996 (NBG); near Brightwater, *Leighton* 1614 (BOL); Smiths Farm, *Lotsy & Goddijn* (L); Cirkelsvlei, *Salter* (BOL 20476; BM, BOL); Cape Point, *Compton* 17942 (NBG); between Smitswinkel Bay and Cirkelsvlei, *Galpin* 12777 (PRE); near Smitswinkel Bay, *Lotsy & Goddijn* 1649 (L). No precise locality: *Lotsy & Goddijn* 1869 (L). Malmesbury: Riebeeck-Kasteel, *Pillans* NBG 144/32 (BOL). Paarl: French Hock Pass, N.W. slopes, *Esterhuysen* 11614 (BOL). Berg River Hock, *Barker* 2961 (NBG); Groot Drakenstein, *Rogers* 10535 (BOL); foot of Gt. Drakenstein Mts near Pniel, *Esterhuysen* 21351 (BOL); Klein Drakenstein Mts near Saleem, *Galpin* 10596 (PRE), 11060 (K, PRE); *Galpin* s.n. (BOL); *Lavis* (BOL 20502). Piketberg: Piketberg Mt., *Zinn* (SAM 54423). Somerset West: Lourensford, *Esterhuysen* 7841 (BOL). Stellenbosch: Stellenbosch Mts, *Lotsy & Goddijn* 1897 (L); Cape Flats, beyond Kuils River, *Pillans* (BOL); between Stellenbosch and Cape Flats, *Burchell* 8362 (K); Bottellary road, *Acocks* 1306, 1307 (s); S. of Bottellary road, *Acocks* 503 (S). Tulbagh: Winterhoek, *Van Breda* 1559 (PRE). Worcester: Hex River valley, near De Doorns, *Stayner* (NBG). Wynberg: Doornhoogte, Cape Flats, *Zeyher* 1627 (a) (P, PRE, S, SAM).

WITHOUT LOCALITY: between Cape Town and George, *Moyle Rogers* (BM); *Thunberg* (UPS, 1010–1011, S). Sieber 235 (BR, G, P); *Lehmann* (P); *Harvey* 857 (CGE); *Mund* (CGE); *Jussieu* 3643 (P); *Brehm* 192 (M); *Villett* (K); *Forster* (K); *Ecklon & Zeyher* 85 (BR, C, Z); Willdenow 926 (B—*G. amoenus* herb. Banks); *Roxburgh* (BM); *Bowie* 378 (G); herb. Banks (BM—*G. amoenus*).

As can be seen from the above synonymy, this species has long been known in Europe and England and had several names bestowed on it. The plants figured in *Curtis's Botanical Magazine* in 1804 and 1807, tt.727 and 992, which

Ker at first placed as varieties of *G. hirsutus* (i.e. *G. caryophyllaceus*) but later treated as two separate species in his *Iridearum Genera*, represent two forms of *G. brevifolius*. The first, t.727, Klatt later described as *G. brevicollis* in 1882.

Klatt's description of *G. spilanthus* in 1863 appears to be drawn partly from a plant of Zeyher's collecting with the MS. name *G. spilanthus* Spreng. and partly from the plant figured as *G. carneus* by Andrews in his *Repository* t.240. The latter is *G. brevifolius* whereas '*G. spilanthus* Spreng.' in herb. Zeyher is *G. gracilis*. In 1882 Klatt described *G. carneus* sensu Andr. (distinct from *G. carneus* Delaroche) as new and named it *G. andrewsii*.

G. orobanche A. DC. in Redouté's *Liliacées*, appears to be a white colour form of *G. brevifolius* and has generally been considered to be so by Ker, Baker and others. Three collections which are recorded as having white flowers, *Pillans* from Riebeeck-Kasteel and *Galpin* and *Lavis* from the slopes and foot of the Klein Drakenstein Mts, may perhaps match Redouté's very fine illustration but as the set and markings of the flowers are nearly always altered or lost in drying, it is difficult to be certain without seeing living flowers. Galpin noted that they are white with mauve and yellow markings on the lower lip.

G. jonquilliodorus Ecklon MS., cited by Baker and Durand and Schinz under *G. brevifolius*, is a separate species, with small, yellowish, scented flowers and two terete leaves (*G. jonquilliodorus* Eckl. ex Lewis).

(b) var. **minor** Lewis var. nov., a var. *brevifolio* planta et floribus minoribus suaveolentibus differt.

Type: Cape, Bredasdorp, *Lewis* 5948 (NBG, holo.).

Stem 12–35 cm high (rarely to 45 cm), usually less than 30 cm, very slender, flexuose. *Flowers* as in var. *brevifolius* but smaller, fragrant, the whole flower, including the ovary, up to 3 cm long, usually less; *perianth tube* 0.8–1 cm long; dorsal lobe 1.8–2 cm long, obovate, obtuse, hooded.

Recorded from the Caledon and Bredasdorp districts where it is occasional on the flats and foothills of the mountains, flowering from April to May.

CAPE.—Bredasdorp: 8 km W. of Bredasdorp on Elim Road, *Lewis* 5948 (NBG); near Bredasdorp, *L. Bolus* s.n. (BOL). Caledon: Shaw's Pass, lower northern slopes, *Lewis* 2312 (SAM); foothills of Riviersonderend Mts, *Lewis* 2313 (SAM).

This small and rather rare variety can readily be distinguished in the field by its very small sweetly scented flowers. The plants on the whole are smaller and more delicate than in typical var. *brevifolius* but closely resemble the smaller form of the latter found in the Caledon and Bredasdorp districts.

(c) var. **robustus** Lewis in Ann. S. Afr. Mus. **40** : 126 (1954). Type var.: Cape, Hopefield district, near Saldanha Bay, *Pole Evans* (BOL 21507; sphalm. 21465 in textu).

Stem usually 65–85 cm high, 3–4 mm diam. at the base. *Basal leaf* 0.7–1.9 cm wide, fairly prominently 4–9 veined. *Spike* closely or fairly closely 12–20-flowered.

Occurring in the same areas as the typical variety, on sandy flats, hills and plateaux, usually in damp places, flowering from January to March, sometimes up to May.

COLOUR PLATE 31. G. J. LEWIS.—Inflorescence; corm and flower stem.

Cape.—Malmesbury: Saldanha Bay, *Pole Evans*. Type (BOL 21507). January 1935.

CAPE.—Caledon: Elgin Forest Reserve, *Lewis* 2310 (SAM 60885). Hopefield: near Saldanha Bay, *Pole Evans* (BOL 21507, SAM 51344), *F. Bolus* (BOL 21465). Malmesbury: near salt pan at Ysterfontein, *Thompson* (BOL). Paarl: between Durbanville and Paarl, *Lewis* (BOL). Piketberg: Aurora, *Thomas* (NBG).

(*d*) var. **obscurus** Lewis, var. nov., a var. *brevifolius* folio basali latiore, floribus cinerascens, perianthii tubo brevior, lobo dorsali leviter cucullato, differt. Type: Cape, Malmesbury Commonage, *Lewis* 6131 (NBG, holo.).

Corm subglobose, 3–4 cm diam. *Stem* 25–75 cm high, usually 35–60 cm, straight or subflexuose. *Basal leaf* 0,6–1,1 cm wide, with narrow raised red margins and 2–3 other veins slightly prominent. *Spike* 6–15-flowered, rarely less. *Flowers* small, not scented, more or less funnel-shaped with the dorsal lobe porrect and only slightly hooded, dull greyish yellow, greyish brown, grey-mauve or grey-blue tinged with yellow, the lower half of the lower lobes yellow outlined with purple above and flecked with purple at the base. *Perianth tube* 8–9 mm long; lobes obtuse or subobtuse, occasionally acute; 3 upper obovate, the laterals rarely elliptic, the dorsal 1,8–2 cm long, 0,8–1,4 cm wide, and laterals 1,4–1,7 cm long, 0,6–1 cm wide; 3 lower more or less spathulate, unguiculate, subequal or the lowest sometimes wider than the laterals, 1,3–1,8 cm long, 5–6 mm wide, the lowest sometimes up to 8 mm. *Stamens* arising 2 mm below top of tube; filaments 0,9–1,1 cm long; anthers 6–7 mm.

Known from the Clanwilliam and Malmesbury districts where it is occasional in hard red ground or sandy soil on hillslopes, flowering in April to May.

CAPE.—Clanwilliam: Pikeniers Pass, Clanwilliam side, *Leipoldt* (BOL 20508). Malmesbury: Malmesbury Commonage, *Lewis* 6131 (NBG), *Thomas* (NBG), *Galpin* 12897 (PRE); Geelkuil farm, *Booyens* 13 (NBG).

This variety is distinguished from var. *brevifolius* by its wider basal leaf and small dull-coloured greyish yellow or greyish brown flowers with a shorter perianth tube and the dorsal lobe porrect and only slightly hooded. Because of its wider leaf, often taller straighter stem and rather more numerous flowers, it is closer to var. *robustus*, but its dull-coloured, rather insignificant flowers distinguish it from both.

95. **Gladiolus pillansii** Lewis in S. Afr. Gdng Ctry Life **25** : 57 (1935). Type: Cape, Bellville district, near road to Melkbosstrand, *Barnard* (BOL 20518, holo.).

Corm globose, 1,5–2,5 cm diam., with soft brown or reddish brown membranous tunics. *Stem* slender, simple, straight or somewhat flexuose, 25–75 cm

high, average 40–60 cm, enclosed at the base in 2 or 3 sheaths, the 1 or 2 outer hyaline, truncate, 0.5–6 cm long, and inner obtuse or subobtuse, sometimes mucronulate, usually greenish or brownish green towards the apex, 3–16 cm long. *Basal leaf* solitary (rarely 2 or 3), not present at flowering time, terete, glabrous, shining, striate or sulcate, 40–60 cm long, 1.5–2 mm diam., enclosed at the base in 2 or 3 obtuse or truncate sheaths 1–12.5 cm long; *cauline leaves* 2 or 3, closely sheathing, faintly striate, obtuse, often mucronulate, or acute, occasionally with a short free adpressed acuminate tip, the lowest up to 25 cm long, the second when present shorter and uppermost 1–4 cm long. *Spike* secund, usually rather laxly 3–8-flowered, occasionally 10. *Bract* lanceolate or oblong, acuminate or acute, 1.3–2.5 cm long, 4–6 mm wide; bracteole slightly smaller and less acute, sometimes inconspicuously bidentate. *Flowers* small, fragrant, pale blue, mauve-blue, grey-blue, mauve or pink, the lower side-lobes with a wide irregular yellow transverse band near the middle of the blade usually outlined with purple above and finely streaked with red or purple below, the lowest lobe with a yellow median stripe or diamond-shaped mark in the lower half, sometimes the tube reddish outside and a reddish median stripe on the outside of the lobes. *Perianth tube* curved, funnel-shaped, 1–1.3 cm long; lobes arranged in 2 rather close-set prognathous lips, acute, subacute or obtuse, the dorsal hooded, porrect, obovate-oblong, 2.2–2.7 cm long, 0.9–1.2 cm wide, and upper laterals 1.6–2.2 cm long, 0.8–1 cm wide; 3 lower deflexed at the apex, oblong or oblanceolate-oblong, unguiculate, 1.8–2.5 cm long, the claws connate for about 3 mm at the base, the blade of the laterals 5 mm and of the lowest 6–8 mm wide. *Stamens* arcuate, arising about 3 mm below top of tube; filaments 1.2–1.3 cm long; anthers linear, subsagittate, minutely apiculate, 6–7 mm long. *Ovary* ellipsoid, 3–4 mm long; style reaching to top of anthers or a little below or above, with spatulate or obcordate branches 1.5–2.5 mm long. *Capsule* ellipsoid, 1–2 cm long, pale, thin-walled; *seeds* oblong-orbicular, broadwinged, pale brown, 6–8 mm long.

Rare in the western and southern Cape coastal districts from Vanrhynsdorp to Bredasdorp, on sandy flats mostly amongst clumps of Restionaceae, flowering from March (occasionally February) to May.

Two varieties are recognized.

KEY TO VARIETIES

Perianth blue or mauve-blue; plants fairly robust, up to 75 cm high	..	..	(a)	var. <i>pillansii</i>
Perianth pink; plants delicate, seldom up to 60 cm high	..	..	(b)	var. <i>roseus</i>

(a) var. **pillansii**

G. pillansii Lewis in S. Afr. Gdng Ctry Life **25** : 57 (1935); L. Bolus, Barclay & Steer, Second Book S. Afr. Flrs t.145 (1936). Sine nom. L. Bolus in J. bot. Soc. S. Afr. **14** : t.2 f.2 (1928), S. Afr. Gdng Ctry Life **19** : 153, f.2 (1929). Type: Cape, Bellville district, near road to Melkbosstrand *Barnard* (BOL 20518; holo.).

This rare, delicate species with its sweetly scented flowers appears to have a fairly wide distribution in the south-western Cape districts. The typical variety has the perianth in various shades of blue to mauve with transverse yellow bands on the lower lobes.

CAPE.—Bellville: near road to Melkbosstrand, *Barnard* (BOL 20518, BOL, K), *Barker* 5335 (NBG). Bredasdorp: 8 km W. of Bredasdorp on Elim road, *Lewis* 5952 (NBG). Caledon: Pringle Bay, *Pillans* 8353 (BOL), *Jackson* (NBG); Mossel River, *Martin* 754 (NBG); lower slope of mountain at Danger Point, *Leighton* 1569 (BOL). Cape: S. of Keerdekoe hill, *Pillans* 8348 (BOL). Cape Peninsula: Schuster's Kraal (Scarborough), *Lewis* 5964 (NBG). Malmesbury: between Malmesbury and Darling, *Salter* 2080 (BOL, BM, K); Mamre, *Lewis* 5965 (NBG); near Kalabaskraal, *Rabinowitz* (SAM 62786). Piketberg: top of mountain above Porterville, *Loubser* 972, 2015 (NBG). Somerset West: Cape Flats, near Paardevlei, *Pillans* (BOL 15180). Stellenbosch: between Bottellary road and Main Line, *Acocks* 43 (S); Bottellary Hills, *Acocks* 4390 (S). Vanrhynsdorp: north of Olifants River, *Leipoldt* NBG 317/32 (BOL, K); Gifberg, *Oliver* (NBG).

An illustration of a flowering stem was published by Louisa Bolus in 1928, without a name, in the *Journal of the Botanical Society of South Africa*, and again the following year in *South African Gardening & Country Life*. The original specimen, being without a corm or leaves, could not be named and it was hoped that readers might rediscover this delicate sweetly scented species. Within a few years these hopes were realized and in 1935 a description of the plant was completed and published under the name *G. pillansii*, in honour of the well-known South African botanist Mr N. S. Pillans, who had collected the first specimen.

The species is closely allied to *G. vaginatus*, another delicate species with small sweetly scented bluish flowers, but differs in having comparatively shorter cauline leaves, a longer perianth tube and the lower lobes with longer claws, longer filaments with shorter anthers, and in the markings on the lower perianth lobes.

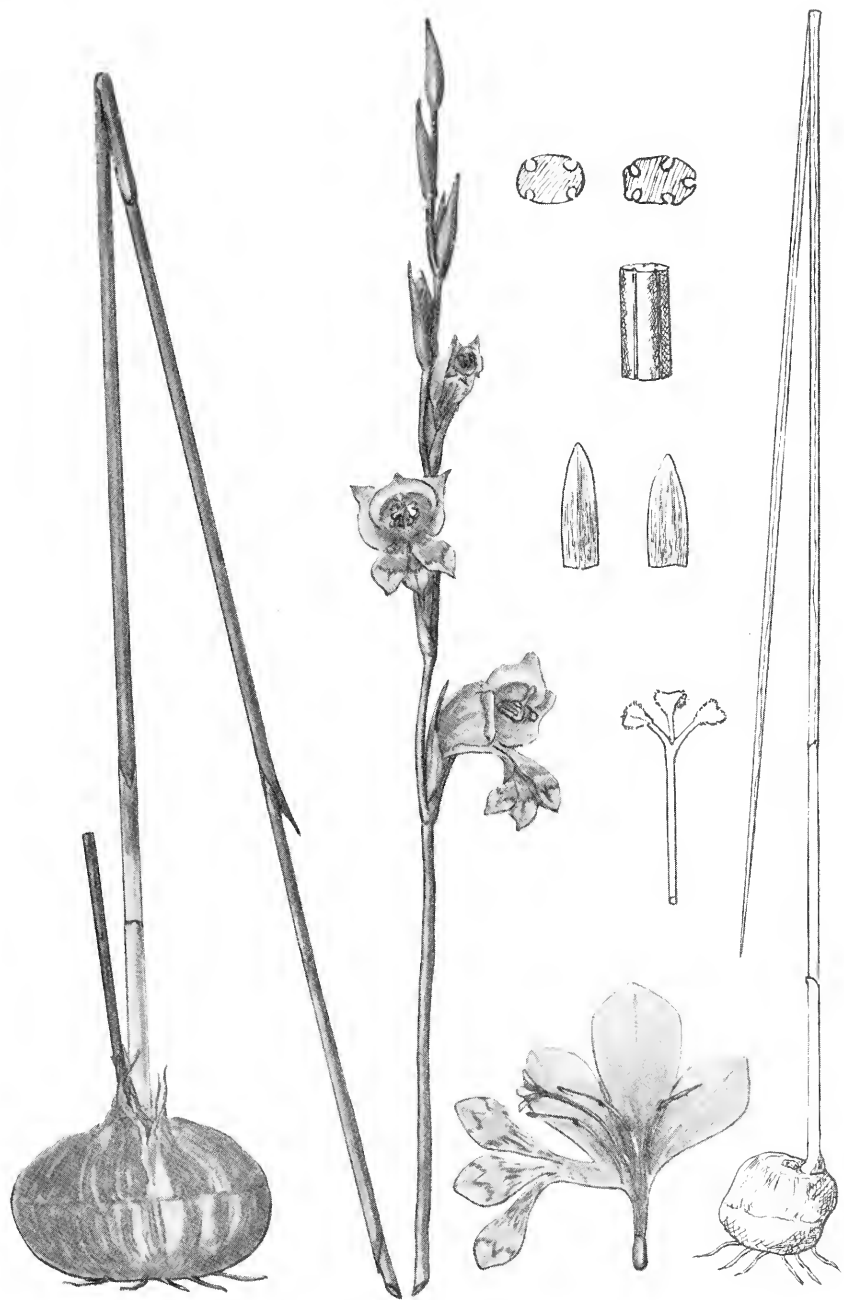
In the Vanrhynsdorp district the corm tunics are rather thicker and more fibrous than usual and extend up for about 3 cm in a fine soft fibrous neck. It has been observed that in cultivation 2 or 3 basal leaves have been produced from one corm, but this is rare.

(b) var. **roseus** Lewis in Flower. Pl. Afr. t.1159 (1953). Type: Cape Peninsula, Schuster's Kraal (Scarborough), *Minicki* (SAM 60953, holo.).

Differs from var. *pillansii* mainly in the colour of the flowers which are pale to fairly deep pink with yellow transverse bands and crimson streaks on the 3 lower lobes similar to those on the lower side lobes of var. *pillansii*. The plants are usually more delicate, seldom up to 60 cm high, with slightly shorter bracts, fewer and smaller flowers, and the perianth lobes more distinctly obovate, widest just below the apex.

Found in moist sandy places amongst Restionaceae on flats and at the foot of mountains on the Peninsula and eastwards to Caledon, flowering from February to May.

CAPE.—Caledon: Hermanus, *Martin* 1058 (NBG); Hagedis Kloof, about 13 km E. of Stanford, *Lewis* & *Linley* (SAM 60892); 16 km from Stanford, *Linley* (SAM 68893); foot of Klein River Mts, *Stokoe*



G. J. Lewis.

FIG. 50. *G. pillansii* var. *roseus*.

(SAM 65822, 69597). Cape Peninsula: Schuster's Kraal (Scarborough), *Minicki* (SAM 60953); foot of mountain above Smitswinkel Bay, *Fisher* s.n. (NBG).

The flowers of this variety closely resemble those of the common and more widespread *G. brevifolius*. Characters by which it can be distinguished are the soft membranous corm tunics and the more or less colourless sheaths at the base of the stem, which in *G. brevifolius* are very often rust-coloured towards the apex. The basal leaves are quite distinct, those of *G. pillansii* and its var. *roseus* being terete and glabrous, and of *G. brevifolius* linear, flat and nearly always pilose, but as these are not present at the time of flowering this character is not of much assistance in recognizing the plants in the field or identifying herbarium specimens, the latter frequently without corms, and seldom with basal leaves.

FIG. 50. From a painting by G. J. Lewis. *Flower. Pl. Afr.* t.1159 (1953).—1, corm and base of flowering stem; 2, inflorescence; 3, corm and sterile basal leaf $\times \frac{1}{2}$; 4, part of sterile leaf $\times 3$; 5, transverse section of five-grooved sterile leaf $\times 5$; 5a, ditto, 4-grooved sterile leaf, $\times 5$; 6, bract; 7, bracteole; 8, flower laid out; 9, top of style and stigmas, $\times 3$.

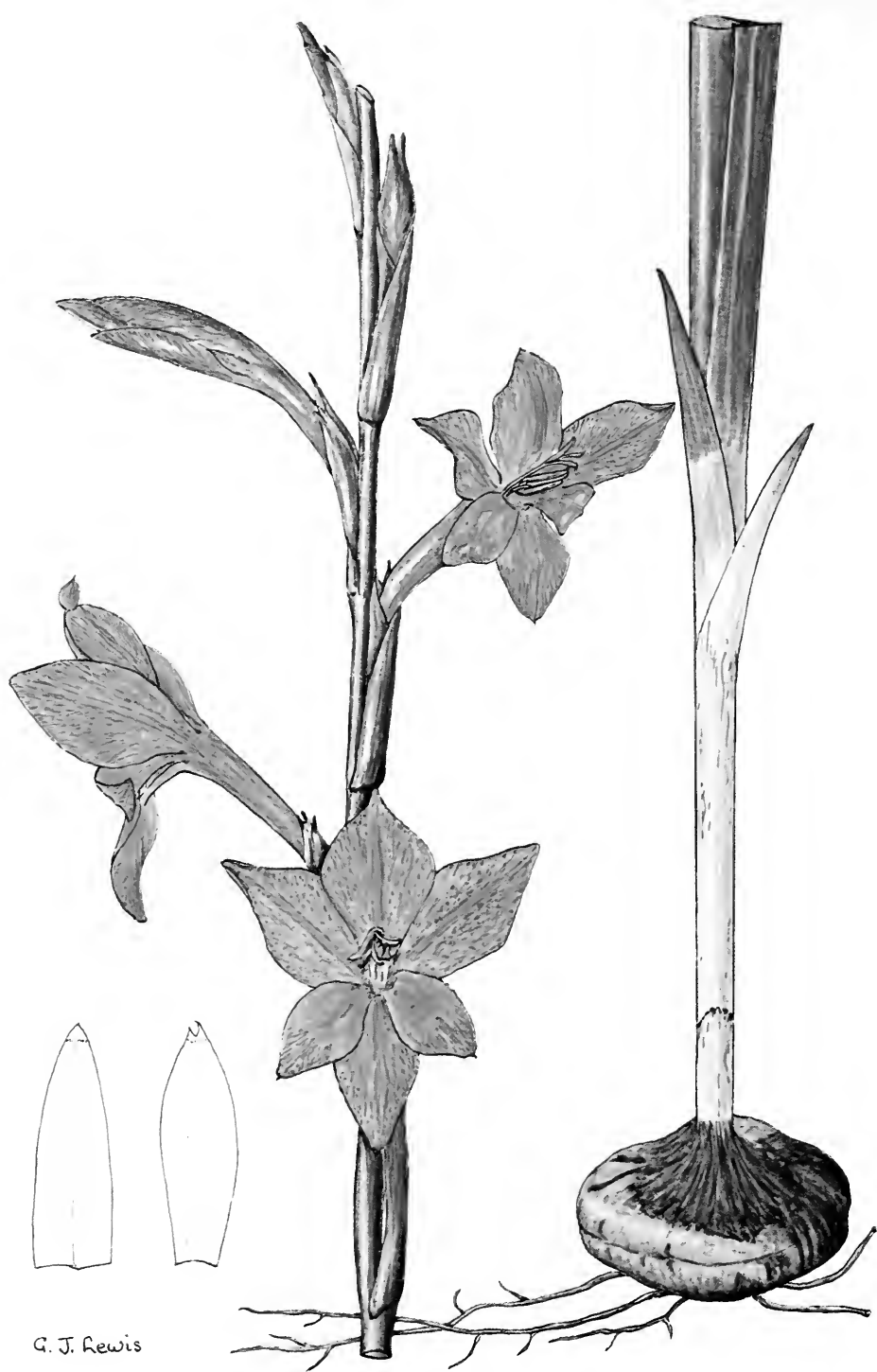
Cape.—Cape Peninsula, Schuster's Kraal, *Minicki* (SAM 60953). Type. February 1951.

96. **Gladiolus martleyi** L. Bol. in S. Afr. Gdng Ctry Life **23** : 47 (1933). Type: Cape, Banhoek, *Martley* 371/32 (BOL, K).

Corm ovoid or subglobose, 1–2 cm diam., with thin brown submembranous tunics. *Stem* slender, simple, 16–35 cm high, usually somewhat flexuose, enclosed at the base in 1 or 2 obtuse hyaline sheaths 1–4 cm long. *Basal leaf* solitary (rarely 2), produced after the flowering period, occasionally the dead remains present with the flowers, up to 35 cm long, 1–2 mm wide, linear, appearing terete and sulcate, with very prominent more or less dilated margins, midrib and often 1 other vein; *cauline leaves* 2–4, closely sheathing, acute or acuminate, 1.5–7.5 cm long, with internodes up to 5 cm long. *Spike* secund, rather laxly to closely 1–10-flowered, usually 2–5. *Bract* oblong, obtuse or acute, 1.1–1.9 cm long; bracteole usually a little shorter, acute or bidentate. *Flowers* small, white usually more or less suffused with rose-pink, the lower lobes with small yellow marks outlined in purple-red near the middle, the laterals in a somewhat trilobed-spathulate shape and lowest a median stripe. *Perianth tube* 1.1–1.6 cm long, curved, the upper half funnel-shaped; lobes arranged in two fairly widely parted lips, subacute, the dorsal hooded, porrect, obovate, 1.8–2.4 cm long, 0.9–1.2 cm wide, and upper laterals elliptic, 1.5–2 cm long, 0.8–1 cm wide; 3 lower subequal, spathulate, unguiculate, 1.8–2 cm long, 5–6 mm wide, the claws connate for 3–5 mm. *Stamens* arcuate, arising 3–6 mm below top of tube; filaments 1.2–1.3 cm long; anthers linear, subsagittate, 5 mm long. *Ovary* ellipsoid, 3 mm long; style reaching to top of anthers or shortly above, with slender oblong-obcordate more or less conduplicate



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branches 2,5–3,5 mm long. *Capsule* ellipsoid, thin-walled, 1–1,5 cm long; seeds oblong-orbicular, pale yellow-brown, broadly winged, about 7 mm long.

Sandy flats at foot of mountains in the Stellenbosch, Somerset West, Caledon and Heidelberg districts of the Cape Province, flowering from March to May.

CAPE.—Caledon: foot of Riviersonderend Mts, *Lewis* 2319 & *Davis* (SAM), *Stokoe* (SAM 63490), *Middlemost* 1540 (NBG). Heidelberg: foot of Langeberge near Heidelberg, *Esterhuysen* 14454 (K, BOL). Somerset West: Vergelegen, *Johnson* (NBG); ? Sir Lowry's Pass (flower-sellers), comm. *L. Bolus* (BOL 17078). Stellenbosch: Banhoek, *Martley*, NBG 371/32 (BOL, K); between Hottentots-Holland and Jonkers valley, *Burchell* 8324 (K).

A small delicate species allied to *G. brevifolius* from which it is distinguished by the different markings on the flowers, the rather shorter cauline leaves which are sheathing almost to the tip, and the narrow glabrous very prominently ribbed basal leaf which appears to be more or less terete. Herbarium specimens without basal leaves and with the markings of the flowers obscured are not easy to distinguish.

97. ***Gladiolus subcaeruleus*** Lewis in Flower. Pl. Afr. **29** : t.1158 (1953). Type: Cape, Caledon district, foothills of Riviersonderend Mountains, *Lewis* & *Davis* 2316 (SAM, holo., K).

Corm subglobose or ovoid, 1–1,5 cm diam., with tunics of hard dark brown more or less united parallel fibres extending up in a neck 3–4,5 cm long. *Stem* very slender, simple, usually somewhat flexuose especially at the base, 18–35 cm high, with 2 basal sheaths, the outer obtuse, hyaline, 3–7 cm long, and inner up to 9 cm, subacute or acute, usually brown at the apex, minutely hispidulous below. *Basal leaf* solitary, appearing after the flowering season but sometimes a dead leaf present with the flowers, terete, about 30 cm long, 1 mm diam., 4-grooved, minutely pilose at the grooves; *cauline leaves* 3, rarely 4, closely sheathing with very short free acute or acuminate tips, the lowest 6–15 cm long and others 1,5–4,5 cm. *Spike* secund, 1–5-flowered, usually 3–4. *Flowers* small, bilabiate, lower lip projecting a little beyond upper, pale blue or mauve-blue (rarely pinkish), the lower lobes marked with yellow outlined with deep mauve or purple, on the laterals an irregular transverse band extending in a median line to the base and the lowest a short median line or diamond-shaped mark, the throat below these lobes minutely streaked and spotted with purple. *Perianth tube* curved, 1,5–1,7 cm long, slender below, funnel-shaped above the middle; *lobes* obovate, obtuse; 3 upper 1,5–2,3 cm long, 0,9–1,2 cm wide, the dorsal slightly larger than the laterals and hooded with the tip correct; 3 lower more or less deflexed, 1,8–2,2 cm long, 5–8 mm wide, unguiculate, the claws connate for 3–4 mm. *Stamens* arcuate, arising 5 mm below top of tube; filaments 1–1,3 cm long; anthers linear, subsagittate, minutely apiculate, 5 mm long. *Ovary* ellipsoid, 3 mm long; style reaching to middle of anthers, the branches about 1,5 mm long with flat obovate stigmas.

Endemic in the southern Cape in clay or gravelly soil on flats and foothills of mountains in the Caledon and Bredasdorp districts, flowering from April to May.

G. J. Lewis.

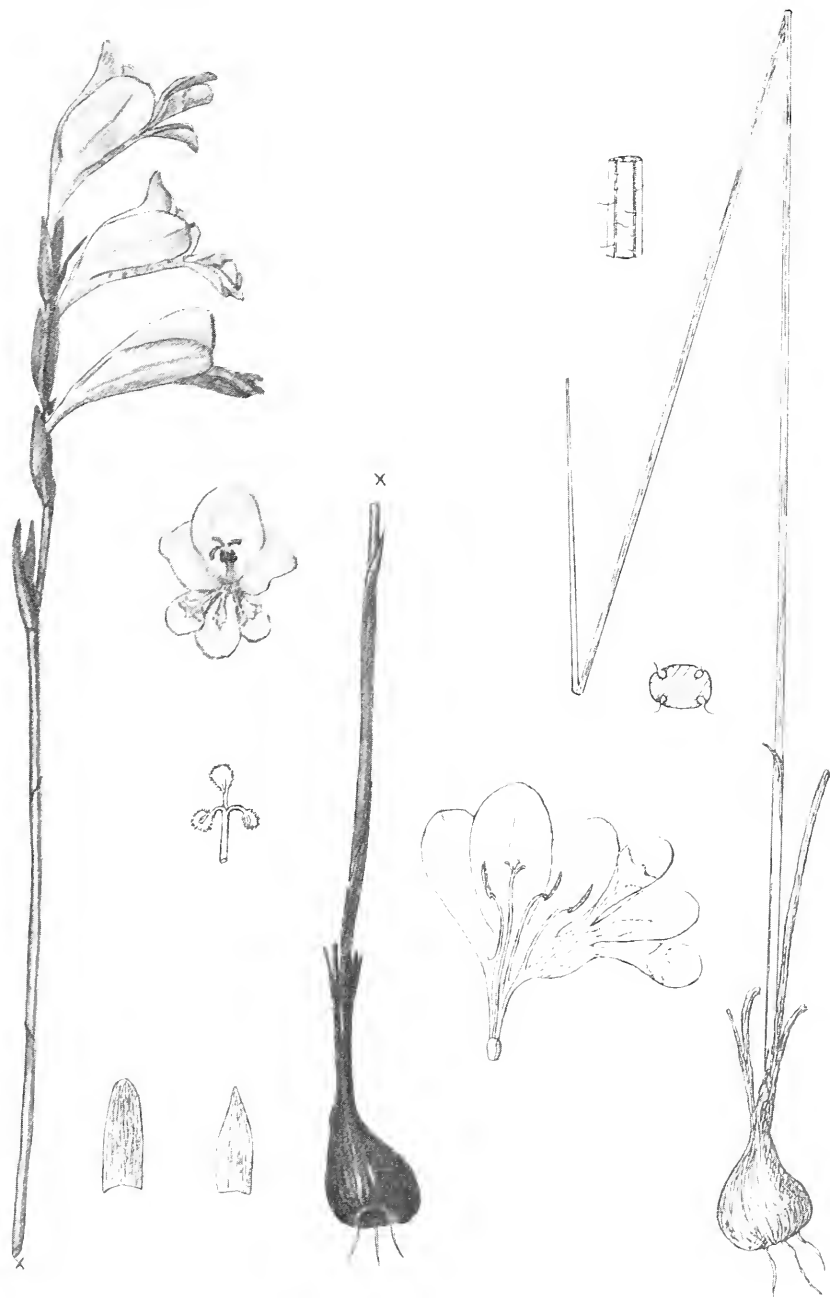


FIG. 51. *G. subcoeruleus*.

CAPE.—Bredasdorp: 5 km W. of Elim on Gansbaai road, *Lewis* 5955 (NBG). Caledon: foothills of Riviersonderend Mts, *Lewis* 2316 & *Davis* (SAM 60891, K, SAM), *Middlemost* 1508 (NBG), *Stokoe* (SAM 63494), *Wilman* 993 (BOL); Happy Valley, *Barker* 2046 (NBG); Hagedis Kloof, near foothills of Klein River Mts, *Lewis* 2314 (SAM); N. foot of Shaw's Pass, *Lewis* 2315 (SAM); Caledon-Villiersdorp road, about 14 km N.W. of Caledon, *Barnard* (BOL); Swartberg, near Sandfontein, *Schlechter* 10355 (PRE, S). Swellendam: Lemoenshoek Mts near Heidelberg, *Stokoe* (SAM 61730).

This species differs from *G. pillansii*, which it closely resembles, in having a smaller corm with somewhat firmer tunics extending up in a fibrous sheath round the base of the stem, in its very slender deeply 4-grooved basal leaf having a few short hairs at the grooves, and its scentless flowers with a slightly longer tube and the lips more widely parted.

FIG. 51. From a painting by G. J. Lewis. *Flower. Pl. Afr.* t.1158 (1953).—1, corm and inflorescence; 2, bract; 3, bracteole; 4, flower front view; 5, flower laid out; 6, top of style and stigmata, $\times 2$; 7, corm and sterile basal leaf (ex hort.); 8, part of sterile leaf; 9, transverse section of leaf, $\times 10$.

Cape.—Caledon, Riviersonderend Mts, *Lewis* and *Davis* (SAM 60891). May 1950.

98. ***Gladiolus jonquilliodorus*** Eckl. ex H. Bol. & Dod in Trans. S. Afr. phil. Soc. **14** : 335 (1903); *Lewis* in Ann. S. Afr. Mus. **40** : 124 (1954) as '*jonquilliodorus* Eckl.'. Type: Cape, Cape Flats, *Zeyher* 450 (SAM, lecto.). (See fig. 52.)

Corm globose, 1.5–2 cm diam., with soft pale brown membranous tunics. *Stem* slender, simple, 28–75 cm high, enclosed at the base in 2 obtuse sheaths 6.5–13 cm long. *Basal leaves* usually 2, terete, 4-grooved, up to 60 cm long, 1.5–2 mm diam., appearing after the flowering season but dead leaves of the previous season often present with the flowers; *cauline leaves* 2 or 3, closely sheathing, acute, the lowest 18–48 cm long and uppermost 2.5–8 cm. *Spike* fairly closely 5–10-flowered, secund. *Bract* oblong, obtuse or acute, 2–1 cm long, 7–5 mm wide; bracteole slightly shorter, subacute, sometimes minutely bidentate. *Flowers* small, fragrant, cream-coloured or pale yellow often flushed outside with pink or mauve, the lower lobes with bright yellow irregular transverse bands near the middle. *Perianth tube* curved, 0.8–1.1 cm long, the upper half funnel-shaped; *lobes* arranged in 2 rather closely set lips, the lower projecting a little beyond the upper; 3 upper lobes obovate, the dorsal hooded, obtuse, 2–2.5 cm long, 1.2–1.4 cm wide at the apex, the laterals acute or subacute, 1.5–2 cm long, 0.8–1 cm wide; 3 lower subequal, 1.4–2 cm long, unguiculate, with slender claws connate at the base for 4–5 mm and recurved obovate acute or subacute blades 5–8 mm wide. *Stamens* arcuate, arising 2–3 mm from top of tube; filaments 1–1.3 cm long; anthers linear, subsagittate, minutely apiculate, 6–8 mm long. *Ovary* ellipsoid, 3–5 mm long; style reaching to top of anthers, the branches 2 mm long, filiform with obcordate stigmata.

Amongst Restionaceae on sandy flats on the Cape Peninsula and in adjoining districts. Flowering period: December–February.

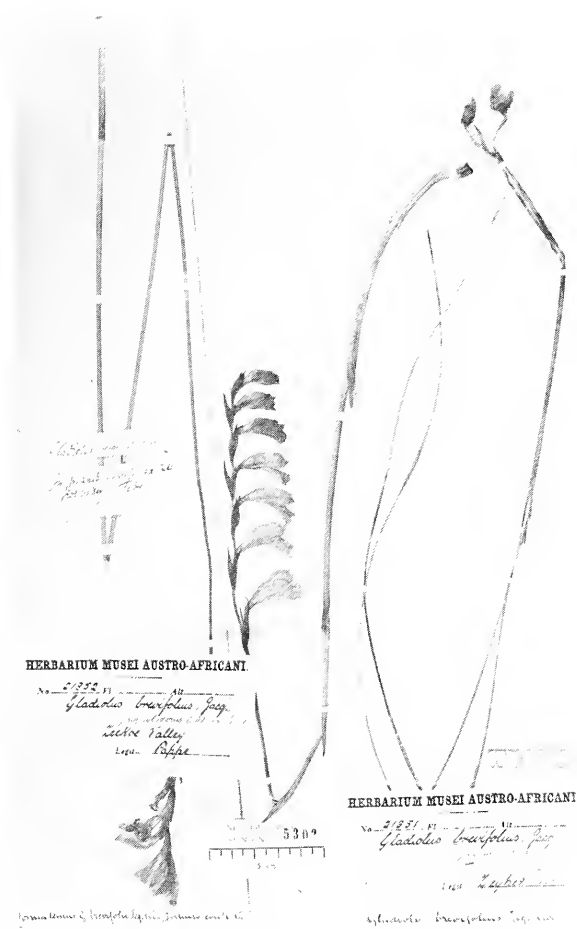


FIG. 52. Type of *G. jonquilliodorus* Eckl. ex Bol. & Dod.

Photo: National Herbarium, Pretoria.

CAPE.—Bellville: Peaslake, Langeberg Road, *Taylor* 1855 (NBG). Cape: Near Potsdam, *Mellish* (SAM 62060); S. of Koeberg, *Pillans* (BOL). Cape Peninsula: Bergvliet, *Purcell* (SAM 62029); Kommetjie, *Linley* (SAM 62061); Schuster's Kraal (Scarborough), *Minicki* (SAM 60912). Stellenbosch: near Bottellary road, *Acocks* 34 (S). Wynberg: near Zeekoewlei, *Pappe* (SAM 21352), *Purcell* (SAM 62030); near Vygieskraal Farm, *Dod* 2392 (K, BOL), *Guthrie* 1386 (BOL), *Pillans* (BOL 10713); Cape Flats, *Zeyher* 450 (SAM), [*? Ecklon & Zeyher* (78.4, P)], *Pappe* (K); Cape Flats near Manenberg, *Zeyher* 1626 (K); Doornhoogte, *Zeyher* 872 (S).

This small-flowered, insignificant but very sweetly scented species was first collected about 130 years ago by Ecklon, Zeyher and Pappe, and distributed by them with the MS. names *G. jonquilliodorus* Eckl. and *G. fragrans* Pappe. In the *Flora Capensis* Baker cited both these MS. names (the former as *G. jonquilliodorus*) in the synonymy under *G. brevifolius* Jacq. It is, however, quite distinct from *G. brevifolius*, from which it differs in having very much thinner membranous corm tunics, 2 terete glabrous basal leaves instead of a single flat linear pilose leaf, as well as in characters of the flower.

Apparently Lewis was unaware of the description given by Bolus and Dod in their article, Flowering Plants and Ferns of the Cape Peninsula, *Trans. Afr. phil. Soc.* 14 : 335 (1903). She therefore described it anew in the *Ann. S. Afr. Mus.* 40 : 124 (1954).

G. jonquilliodorus is closely allied to *G. pillansii*, which has the same habitat and occurs in the same areas, but besides the difference in flowering period and colouring of the flowers there are other distinguishing characters, such as 2 basal leaves instead of one, the flowers more closely spaced on the spike, shorter bracts, the dorsal lobe widest at the apex and obtuse instead of acute or subacute and widest below the apex, and the lower lobes comparatively shorter with longer and more slender claws.

99. ***Gladiolus aurantiacus*** Klatt in *Linnaea* 35 : 378 (1867–8); Bak. in *J. Linn. Soc.* 16 : 176 (1877), *Handbk. Irid.* 221 (1892), *Fl. Cap.* 6 : 159 (1896); Dur. & Schinz, *Consp. Fl. Afr.* 5 : 213 (1893). Type: Natal, Pietermaritzburg, *Sutherland* (K, holo.).

Corm depressed-globose, sometimes somewhat irregular in shape, 3–4 cm diam., the tunics pale reddish brown, membranous, soon disintegrating. *Stem* arising obliquely from corm, usually stout or moderately stout, seldom branched, 45–70 cm high, with 2–4 basal sheaths, the 1–3 outer hyaline, obtuse or subacute, 1.5–10 cm long, the inner up to 13 cm long, acute or acuminate, green towards apex. *Basal leaves* (not present at flowering time) 7–8, distichous, lanceolate or ensiform, 45–75 cm long, 0.5–2.8 cm wide, usually 1–2 cm; moderately firm, several-veined with midrib fairly prominent and usually 2–3 others slightly raised; *cauline leaves* 4–5, more or less enclosing stem to base of spike, 25–7 cm long, usually more than half sheathing with a short lanceolate blade. *Spike* subdistichous or secund, laxly to fairly closely 8–12-flowered. *Bract* lanceolate, oblong or ovate-oblong, acuminate or acute, 4–2.5 cm long (lowest occasionally up to 5 cm), green or purplish green, somewhat thin and soft in texture; bracteole as long as bract or slightly shorter, oblong, shortly

bidentate. *Flowers* fairly large, up to 10 cm long, tubular, golden-yellow or orange and yellow, often partly stippled or finely streaked with red. *Perianth tube* 4–5,5 cm long, more or less curved and somewhat abruptly dilated near the middle, the upper half subcylindrical, 0,6–1 cm diam. at throat; *lobes* acute or subacute, sometimes distinctly narrowed to the base and subunguiculate, the dorsal porrect, not or only slightly hooded, and others patent or 3 lower deflexed; 3 upper subequal and elliptic or the dorsal sometimes obovate and laterals more or less ovate, 3–4,3 cm long, 1,5–2,4 cm wide; 3 lower oblong or elliptic, the laterals 2–2,8 cm long, 1–1,5 cm wide, and lowest varying from slightly smaller to slightly larger, occasionally distinctly larger, ovate and up to 3 cm long, 1,8 cm wide. *Stamens* arcuate, arising near middle of tube; filaments 3,3–3,8 cm long; anthers linear, subsagittate, 1–1,2 cm long. *Ovary* oblong or subtrilobate, 4–6 mm long; style reaching base or middle of anthers, with spatulate branches 3–5 mm long. *Capsule* oblongo-globose, 2,5 cm long, chartaceous; *seed* 8 mm in diam. broadly winged.

Recorded from Natal, Swaziland and the south-eastern Transvaal where it is locally frequent on hillsides or in moist stony ground on flats, flowering in October–November.

COLOUR PLATE 32. G. J. LEWIS.—Top of flower spike; corm and base of flowering stem; bract and bracteole.

Natal.—Pietermaritzburg: *Herbst*, ex hort. Kirstenbosch (NBG 77122) October 1964.

NATAL.—Camperdown: Camperdown, *Wood* 4968 (B, G, K, SAM); Umkomanzi River, *Wheeler* (AMD). Durban: Port Natal, *Sutherland* (S). Hlabisa: Hluhluwe Game Reserve, *Ward* 1538 (PRE). Lions River: Merrivale, *Moll* 1335 (PRE). Klip River: Biggarsberg, *Pole Evans* 3990 (K, PRE). Pietermaritzburg: Pietermaritzburg, *Sutherland* (K, S), *Wilms* 2292 (K), *Sim* (PRE, 11520), *Fairall* 41, 119 (NBG), *Herbst* (NBG). Polela: Polela, *Clarke* 45 (BM). Pongola: between Pongola and Piet Retief, *Mauve* (PRE). Richmond: Nelsrus, near Richmond, *Johnson* (PRE). Umzinto: Dumisa, *Rudatis* 1771 (G, GRO, L, PRE, Z); Umkomaas, *Sidey* 3866 (PRE); between Umzinkulu River and Umkomaas, *Tyson* 2661 (SAM). Without precise locality: *Sanderson* (K); *Sidey* (K); *Wood* 9223 (P); *Haygarth*, herb. *Wood* 11017 (PRE, Z).

TRANSVAAL.—Carolina: Badplaats, *Bayliss* 2507 (NBG). Piet Retief: Piet Retief, *Galpin* 9598 (K, PRE), *Collins* TRV 13626 (PRE); Iswepe, *Sidey* 1542 (PRE, S, SAM); Mooihoek, *Devenish* 158 (PRE).

SWAZILAND.—Hlatikulu: Hlatikulu, *Compton* 32397 (PRE); near Goedgedun, *Compton* 32397 (NBG), *Bayliss* 694 (NBG). Mankaiana: Mankaiana, *Compton* (PRE), 30875, 31351 (NBG). Without precise locality: *Stewart* sub TRV 10247 (PRE).

An unusual and striking character distinguishes this species for it is the only one in this group in which the basal leaves are developed at a different season from the flowering shoot. Its normal flowering period is at the beginning of the rainy season, from the end of September to November, at which time there is no sign of any basal leaves; they do not appear until some weeks later and are not fully developed until about March. The corm also is unusual, being fairly large and flattish, often rather irregular in shape, and grows at an angle in the ground with the flowering stem arising obliquely from it.

The fairly large attractive flowers, varying in colour from pure golden-yellow to yellow and orange or red and yellow, are very similar to those of the closely related genus *Homoglossum*, having the fairly long tube slightly or

distinctly curved and somewhat abruptly dilated near the middle and more or less cylindrical above.

100. **Gladiolus brachyphyllus** Bol. f. in Ann. Bolus Herb. **2** : 103 (1917). Type: Transvaal, on the Selati Railway between Komatipoort and Letaba River, Rogers 11807 (BOL, holo., GRA, K, PRE).

Plants up to 1 m tall, glabrous. *Corm* depresso-globose, c. 2 cm in diam., the old corm long persisting, with thin reddish brown tunics. *Leaves* (not present with flowering spike), 3 (1–2 in immature plants) linear, up to 1 m long and 1,3 cm wide, outer leaf shorter, second longest and third nearly as long, soft, thin, with a lax twist. *Spike* straight, erect, up to 1 m tall, simple or with a basal side-branch, with 4 sheathing bract-like leaves covering the scape nearly to the top, upper with short free linear-acuminate blades. *Flower bract* lanceolate-acuminate, up to 3 cm long, 5 mm broad; bracteole slightly smaller, usually with a bifid setaceous tip. *Flowers* up to 10 on a spike, secund, laxly spaced. *Perianth* 4–5 cm long, pink or mauve-pink with red spots at the base, the lowest lobe with a white area flanking the dark medial line; tube 1,5–2 cm long, funnel-shaped, fairly wide at the throat, erect or slightly curved; *limb* somewhat bilabiate, the lobes oblong or elliptic, obtuse to acute, narrowed towards the base, upper 2–3 cm long, c. 1 cm wide; 3 lower subequal, somewhat smaller. *Stamens* arcuate arising near the top of the tube, filaments 2 cm long, anthers linear, 8 mm long, purple. *Capsule* oblongo-ellipsoid, 2,5 cm long, chartaceous, whitish to pale brown, with anastomosing veins and minute golden brown speckles; *seed* 1 cm long with a large golden brown wing.

A Lowveld species recorded from the eastern and southern areas of the Kruger National Park to the northern part of Swaziland and east of Komatipoort in Mozambique, at altitudes not exceeding about 300 m. It flowers in October–November for a short period, the whole process from flower to ripe seed taking 2½–3 weeks.

TRANSVAAL.—Kruger National Park: Makutwenine, Van der Schijff 3249 (PRE); between Ikukuya and Komatipoort, Stevenson-Hamilton (PRE); Munweni near Lebombos, Brynard & Pienaar 4357 (PRE); E. of Mlondozi dam and Muntshu hill (E. of Tshokwane), Mauve & Van Wyk 4822, fruiting (PRE). Without precise locality: on the Selati Railway between Komatipoort and Letaba River, 300–600 m, Rogers 11807 (BOL, holo., GRA, K, PRE).

SWAZILAND.—Tshaneni, Barrett 120 (PRE).

MOZAMBIQUE.—between Komatipoort and Lourenço Marques, Thompson (K, PRE).

The species has been rarely collected, possibly because of the short flowering period and its inaccessibility but it is not rare. It inhabits grassveld on heavy soil, the spikes emerging above the grass. It is common locally and found as solitary plants or a few together.

= *G. atropurpureus* Bak.
101. **Gladiolus unguiculatus** Bak. in J. Linn. Soc. **16** : 178 (1877), Handb. Irid. 223 (1892), Fl. Trop. Afr. **7** : 372 (1898). Type: Sierra Leone, Morson (K, holo., PRE, photo.). *G. cochleatus* Bak. in J. Bot., Lond. **14** : 334 (1876); non Sweet (1832). Type: as for *G. unguiculatus*.

G. oatesii Rolfe in Oates, Matabeleland, ed. 2 : 410 (1889); Bak., Handb. Irid. 226 (1892), Fl. Trop. Afr. 7 : 373 (1898). '*G. brevifolius*' of first edition. Type: Rhodesia, Matabeleland, Oates (K, holo., PRE, photo.). *G. flexuosus* Bak. in Kew Bull. 1894 : 390 (1894), Fl. Trop. Afr. 7 : 372 (1898); non. L.f. Type: Urungu, Fwambo, Carson 79 (K, holo., PRE, photo.). *G. gracilicaulis* Lewis in Jl S.A. Bot. 7 : 29 (1941), nom. nov. for *G. flexuosus* Bak., non L.f.

Corms forming small clumps or solitary, ovoid or subglobose, 1.3–2.3 cm diam., the tunics of fine brown more or less reticulate fibres, with a dark reddish brown submembranous neck 3–8 cm long above. *Stem* slender, simple or branched, subflexuose, 26–72 cm high, usually 30–55 cm, with 2 or occasionally 3 basal sheaths, the 1–2 outer obtuse to acute, hyaline or submembranous and reddish brown, 2.5–11 cm long, the inner up to 14 cm, acute, usually mucronulate or apiculate, greenish towards the apex. *Basal leaf* usually produced after the flowering period, solitary, linear, grass-like, glabrous, about 45–50 cm long, 5–6 mm wide, with narrow hyaline margins and the midrib prominent; *cauline leaves* 2–3, reduced to sheathing bracts usually with short naked internodes between, sometimes partly imbricate, the lowest up to 30 cm long, with a long sheath and short lanceolate blade 2.5–7 cm long, 2–4 mm wide, with slightly prominent margins and midrib, the second smaller and uppermost 2–8 cm long, with a short free adpressed acuminate tip. *Spike* second, rather laxly to closely 4–13-flowered. *Bract* oblong, acuminate or acute, 1–1.7 cm long; bracteole as long as bract or slightly longer or shorter, usually submembranous and minutely bidentate. *Flowers* small, about 3 cm long, bilabiate, prognathous, pale blue or mauve with dark blue or purplish rimmed blotches on lower lobes. *Perianth tube* curved, narrowly funnel-shaped, 0.6–1.2 cm long; *lobes* unequal, acute or subacute, minutely apiculate, the dorsal galeate, porrect, broadly elliptic or obovate, subunguiculate, 1.8–2 cm long, 1–1.2 cm wide; upper laterals subunguiculate, elliptic or more or less spatulate, the lower margins partly connate to claws of lower lobes, 1.2–1.6 cm long, 6–9 mm wide; 3 lower unguiculate, the claws 0.7–1.4 cm long, connate for 5–8 mm, the laterals with elliptic or oblong blades 5–8 mm long, 3–4 mm wide, and lowest a little larger, ovate-oblong or elliptic-lanceolate. *Stamens* arcuate, arising near middle of tube; filaments 1.2–1.5 cm long; anthers linear, subsagittate, 7–8 mm long. *Ovary* ellipsoid or rotund, 3–4 mm long; style reaching about middle of anthers, with oblanceolate stigmatic branches 2–3 mm long. *Capsule* ellipsoid, pale greenish, thin-walled, 1.7–2 cm long; *seeds* brown, more or less oblong, broadly winged, about 5 mm long.

A widespread tropical savannah species extending from Sierra Leone to the warmer and drier parts of Transvaal, flowering during November and December.

TRANSVAAL.—Marico: Marico district, Holub (K); Matebe River, Holub (BOL). Messina: Messina, Rogers 20726 (PRE, BOL). Pietersburg: Pietersburg, Murray 584 (K, PRE). Pilgrim's Rest: Pilgrim's Rest, Greenstock (BM). Potgietersrus: Potgietersrus, Crawley sub TRV 10558 (BOL, PRE), Sidesy 2468 (S), Leendertz sub TRV 7388 (PRE). Pretoria: Apies River, Burke 109 (BM, K). Rustenburg: Beestekraal, Hards 101 (PRE); near Doornpoort Post Office, Acocks 12405 (PRE). Sibasa: Mabasa, Lang

sub TRV 32146 (PRE). Warmbaths: Warmbaths, Bayliss 1806 (NBG); 14 km N. of Warmbaths, Sidey 1344 (PRE); Codd 3452 (PRE). Waterberg: Nooitgedacht, near Naboomspruit, Galpin 13488 (BOL, K, PRE), 13762 (K, PRE); 10 km N.E. of Naboomspruit, Verdoorn 2468 (PRE); Waterberg, Gillett 2774 (BOL); Sidey 1344 (S); 8–9 km S. of Warmbaths, Sidey (K); Palala road, Smuts & Gillett 3372 (PRE); Nylstroom, Van Dam sub TRV 20751 (PRE); 27 km N.E. of Nylstroom, Codd 2267 (PRE). WITHOUT LOCALITY: Zeyher 1623 (BM, CGE, K); Burke (CGE).

The species has a wide distribution in the drier parts of the central African savannah and flowers in spring before the leaves appear. If left undisturbed the corms may form compact clumps from which a number of buds develop close together, some producing spikes, others the beginnings of a leaf.

G. atropurpureus Bak. appears to be a dark colour form of this species. The species is closely related to *G. pretoriensis* but can be distinguished by the seeds which are typically winged and flat, not small, angular and wingless as in the latter. Moreover *G. pretoriensis* flowers towards the end of summer and by that time its basal leaf has reached maturity and the spike emerges from the centre; it is a smaller more wiry plant with thin brown bracts and a smaller purplish-brown perianth with yellow blotches, whereas *G. unguiculatus* is more robust with a pale mauve-coloured flower with dark-rimmed blotches on the lower lobes.

102. **Gladiolus woodii** Bak., Handbk. Irid. 207 (1892), Fl. Cap. 6 : 144 (1896); Dur. & Schinz, Consp. Fl. Afr. 5 : 227 (1893); Oberm. in Flower. Pl. Afr. 35: t.1378 (1962). Trauseld, Wild Flow. Natal Drakensberg, opposite p. 49 (1969); (photo of flower placed upside down). Type: Natal, Inanda, Wood 618 (K, holo., BM, SAM).

G. trichostachys Bak. in Bull. Herb. Bois. Ser. 2. 4 : 1007 (1904); Pole Evans, Flower. Pl. S. Afr. 5 : t.163 (1925). Type: Transvaal, Irene, Conrath 579 (GZU, holo.). *G. nudus* N.E. Br. in Kew Bull. 1921, 298 (1921). Type: Transvaal, Barberton, Thornecroft 1067 (K, holo.).

Corm globose or ovoid, 1.5–3 cm diam., with tunics of pale or reddish brown somewhat matted fibres, soft or fairly firm and partly connate, extending up in a thin neck 3–7 cm long. *Stem* simple, slender, straight or subflexuose, 38–60 cm high (rarely 70 cm), with 2 basal sheaths, the outer hyaline, obtuse or subacute, up to 12 cm long, the inner up to 15 cm, acute, green, sometimes brown at the apex, pilose, sometimes also hispidulous. *Basal leaf* solitary, produced after flowering period, linear or lanceolate, pilose, up to 60 cm long, 4–8 mm wide, firm, with the margins, midrib and often 2–3 other veins more or less prominent; *cauline leaves* 2–4, usually 3, closely sheathing with short free acute or acuminate tips (rarely the lowest with a lanceolate blade up to 7 cm long resembling the basal leaf), the lowest up to 26 cm long, striate, pilose, the second sparsely pilose or glabrous and uppermost bract-like, glabrous, 1.5–4.5 cm long. *Spike* secund or subdistichous, fairly laxly to closely 4–12-flowered. *Bract* oblong, acute or obtuse, 1–2 cm long, submembranous, greyish green sometimes tinged with purple or red; bracteole as long as bract or slightly shorter, usually minutely bidentate at the apex. *Flowers* small, bilabiate, the

colour variable, mostly deep purple-maroon ('dark brown')—sometimes with the lower side lobes lime-green to mauve, or pale to greenish yellow usually with brown or maroon lines or blotches on some of the lobes and a small dark glandular spot at the interstices (other colours mentioned below). *Perianth tube* slightly curved, narrowly funnel-shaped, 0,8–1,2 cm long; *lobes* obtuse and apiculate, occasionally emarginate or acute, the dorsal slightly hooded, porrect, and others patent; 3 upper subunguiculate to distinctly unguiculate, the dorsal obovate, oblong or suborbicular, 1,4–2 cm long, 0,7–1,2 cm wide (rarely up to 2,8 cm long, 2 cm wide), the laterals slightly smaller with suborbicular, ovate or occasionally somewhat deltoid blades; 3 lower unguiculate, the claws narrow, involute, connate for 2–4 mm at the base, the blade of the lowest similar to upper laterals, up to 1 cm long, 7–9 mm wide (rarely to 1,7 cm long, 1,1 cm wide), the laterals smaller, more or less pandurate when flattened, with small but sometimes very distinct auricles at the base—occasionally the lowest lobe similar but slightly larger. *Stamens* arcuate, arising about 4 mm below top of tube; filaments 1–1,2 cm long (rarely 1,4 cm); anthers dark, linear, subsagittate, 6–8 mm long. *Ovary* rotund or subturbinate, 2–4 mm long; style reaching to middle or nearly to top of anthers, with spatulate or oblanceolate branches 2–4 mm long. *Capsule* subglobose to distinctly 3-lobed, thin-walled to coriaceous, pale or dark brown, 0,8–1 cm long, about 1 cm wide; *seeds* reddish brown, with thickish spongy wings, ovate or oblong-orbicular, 5–6 mm long, 3–4 mm wide.

Widespread but never frequent in any area, usually among rocks in grassveld on mountain slopes 800–2 000 m alt., flowering from October to December.

NATAL.—Bergville: Cathedral Peak, *Killick* 1547 (K, PRE), 1042 (PRE); Natal National Park, *Galpin* 10381 (PRE). Estcourt: Mooi River, *Mogg* 3177 (PRE). Hlabisa: Hluhluwe Game Reserve, *Ward* 3138 (PRE). Inanda: Inanda, *Wood* 618 (BM, K, SAM), *Rehmann* 8269 (Z). Klip River: Collings Park, *Acocks* 13860 (PRE). Lion's River: Cedara, *Wood* 11490 (BOL, GRA, PRE, SAM), 11976 (PRE, Z); Shafton. Howick, *Hutton* 169 (BM, GRA) 356 (PRE, GRA); 3 km N.W. of Howick, *Moll* 1172 (PRE). Mtonjaneni: Mtonjaneni, *Acocks* 12941 (PRE). New Hanover: Glenside, Noodsberg, *Thode* (BOL). Pietermaritzburg: Ketelfontein Hill, above Pietermaritzburg, *Page* (NBG). Umvoti: Greytown, *Wylie* (PRE). Utrecht: Retirement, *Devenish* 899 (K, PRE); Kafir Drift, *Thode* A364 (PRE). Without precise locality: *Buchanan* (K).

TRANSVAAL.—Barberton: Saddleback Mt., *Galpin* 1024 (BOL, GRA, SAM, PRE, Z), *Saltmarshe* in herb. *Galpin* 1024 (K); Barberton, *Thorncroft* 1067 (K, type of *G. nudus*), 2021 (K, PRE), *Rogers* 18353 (K, G), *Thorncroft* in herb. *Rogers* 19176 (BOL, GRA, K, SAM, Z), 25506 (Z); Upper Moodies, Barberton, *Galpin* 586 (BOL, PRE, K, Z); near Queen's River, *Galpin* 524 (BOL, K, Z); Noordkaap, about 16 km N. of Barberton, *Bayliss* BS711 (NBG); Nelshoogte Pass, on Barberton–Carolina border, *Levis* 6179 (NBG). Belfast: 13 km N. of Belfast, *Codd* 6652 (K, PRE); near Belfast, *Schlieben* 8437 (PRE); Dullstroom, *Strey* 3441 (K, PRE); 23 km N.E. of Dullstroom, *Marais* 17 (PRE). Bronkhorstspuit: Rayton, *Rogers* 20427 (BOL); Premier Mine, *Rogers* 14721 (BOL), 19844 (Z). Carolina: near Bosmans River, *Galpin*, *PRE* 13497 (BOL, PRE); Carolina, *Rogers* 19115, 19666 (BOL), *Galpin* 12307 (PRE), s.n. (BOL); Badplaas, *Bayliss* 2498 (NBG); E. of Carolina, *Reynolds* 3352 (K, PRE). Ermelo: Lake Chrissie, *Pole Evans* *PRE* 13182 (K, PRE); Ermelo, *Burt* *Davy* 5496 (PRE). Germiston: Modderfontein, *Conrath* 578 (Z). Groblersdal: about 16 km N.E. by E. of Groblersdal, *Acocks* 20923 (K, PRE). Johannesburg: Johannesburg, *Moss* 5573 (BM, PRE, K), *Rogers* 11685 (BOL), 12012 (K), *Rand* 902, 903 (BM). Krugersdorp: Witpoortjie, *Murray* 583 (PRE), *Repton* 3805 (PRE). Letaba: The Downs, *Moss* & *Rogers* 477 (K), 478 (BOL), *McNeil* (NBG); Cyprus Farm, *McNeil* (NBG); Duiwelskloof, *Scheepers* 795 (K); Shiluvane (Shilouvane), *Junod* 1696 (G), 2579 (Z). Lydenburg: Boshoeck, western Steenkampsberg, *Young* A380 (PRE). Middelburg: Middelburg, *Young* A51, TRV 32631 (K), *Schlechter* 4053 (Z); 6 km N. of Stoffberg, *Codd* 9766, 10087 (K, PRE). Nelspruit: 5 km S.W. of Nelspruit, *Prosser* 1282 (K, NBG, PRE). Pietersburg: Haenertsburg, *Thompson* (K, PRE), *Brent* 124 (PRE), *Pott* 4692 (PRE). Piet Retief: Iswepe, *Sidey* 1526 (PRE, S); Piet Retief, *Galpin* 9646 (K, PRE); Mooihoek,

Devenish 130 (PRE). Pilgrim's Rest: near Kowyn's Pass, *Galpin* 14203 (BOL); 16 km E. of Graskop, *Codd* 548 (PRE). Pretoria: Irene, *Conrath* 579 (GZU—type of *G. trichostachys*), *Pole Evans* (PRE), *Burt Dacy* 746 (PRE), *Prosser* 1316 (K, NBG, PRE); *Obermeyer* 28 (BOL, PRE); Six Miles Spruit, near Pretoria, *Schlechter* 3574 (BOL, GRA, PRE). Wakkerstroom: Oshoek, *Devenish* 166, 167 (PRE). SWAZILAND.—Mankaiana: Evelyn Baring Bridge, *Compton* 29164 (NBG). Mbabane: Forbes Reef road, *Compton* 28267 (NBG, PRE); Mbabane, *Lam & Meeuse* 5147 (L, PRE). Without precise locality: *Stewart* 94 (K), sub TRV 8873 (PRE).

This small-flowered complex species, with its basal leaf and flowering shoot produced at different times, is allied to the small autumn-flowering species of the Cape Province, e.g. *G. brevifolius* Bak. Like them, it flowers at the beginning of the rainy season after a long dry period, but being confined to the summer-rainfall area this is in the spring or early summer months.

103. ***Gladiolus parvulus*** Schltr. in Bot. Jahrb. **40** : 91 (1908); Trauseld, Wild Flow. Natal Drakensberg, 47 (1969). Type: Natal, Umzinto district, Umtwalumi, *Rudatis* 122 (sphalm. 132) (B, holo.).

G. pubescens Bak. in J. Bot., Lond. **14** : 333 (1876), Handb. Irid. 204 (1892), Fl. Cap. **6** : 142 (1896); Dur. & Schinz, Consp. Fl. Afr. **5** : 223 (1893); non Lam. 1791. *G. pubigerus* Lewis in Ann. S. Afr. Mus. **40** : 132 (1954), nom. nov. Type: British Kaffraria, *Cooper* 458 (K, holo.). *G. subaphyllus* N.E. Br. in Kew Bull. **1909** : 53 (1909); Lewis in Jl S. Afr. Bot. **7** : 54 (1941). Type: Natal, Pietermaritzburg district, Swartkop ('Zwaartkop'), *Wylie* (Wood 10153, K, holo., BOL, NH, Z, PRE, photo.).

Geissorhiza gracilis Bak., Handb. Irid. 155 (1892), Fl. Cap. **6** : 70 (1896); Dur. & Schinz, l.c. 178. Type: Cape, Umzimkulu district between Kokstad and Clydesdale, Suurberg, *Tyson* 1872 (K, holo., BOL, SAM).

Ixia brevifolia Bak., Handb. Irid. 165 (1892), Fl. Cap. **6** : 84 (1896); Dur. & Schinz, l.c. 178. Type: as for *Geissorhiza gracilis* Baker.

Plants 20–40 cm tall. *Corms* subglobose, 1–1.5 cm diam., with tunics of slightly coarse vertical fibres, usually extending up in a thin neck. *Leaf* produced on non-flowering plants, solitary, basal, linear, up to 15 cm long, 2–3 mm wide, apex spinescent, pilose with long straggling hairs between the prominent stramineous margins and ribs. *Spike* simple, closely 2–3(–5)-flowered, up to 40(–50) cm tall, usually geniculate at the top with the second flowers porrect; scape thin, wiry, glabrous, surrounded at the base with a short truncate membranous sheath followed by a leaf-like, green sheathing bract which envelops the scape for about half its length; it is similar in appearance to the non-flowering leaf but tubular instead of flat, up to 19 cm long and near the free flat tip about 2.5 mm wide, with long straggling hairs (rarely glabrous) between prominent stramineous ribs. Upper sterile bract situated just below the flowers, very small, 5 mm, tubular, sparsely hairy or glabrous. *Flower bract* oblong, 7–10 mm long, brownish, membranous, striate, apex obtuse or acute; bracteole smaller, bidentate, rarely divided nearly to the base. *Flowers* broadly funnel-shaped, c. 2 cm long, regular or slightly zygomorphic, mauve, pink or white; perianth tube straight or somewhat curved, widening gradually above, about 9 mm long; lobes subequal or lower slightly smaller, ovate, acute to

acuminate, 12–18 mm long and 5–8 mm wide. *Stamens* erect, arising near the base of the perianth-tube and reaching to middle of lobes, anthers linear, subsagittate, 6–7 mm long. *Ovary* rotund, 2–3 mm long; style reaching to top of anthers, with linear spathulate branches about 2 mm long. *Capsule* (immature) globose, 6 mm in diam., many seeded.

Recorded from the eastern Cape, Natal and the eastern Transvaal, rare or locally frequent on mountain grass slopes from 300 to 3 300 m altitude, flowering October to November.

CAPE.—Mount Currie: Mount Currie, *Goossens* 369 (PRE). Umzimkulu: Mt. Suurburg (East Griqualand), between Kokstad and Clydesdale, *Tyson* 1872 (K, BOL, SAM; type of *Geissorhiza gracilis* and *Ixia brevifolia*).

NATAL.—Bergville: Cathedral Peak Forest Station, *Killick* 1625 (K, PRE). Estcourt: Mooi River, *Wood* (K); Giant's Castle, *Symons* 33, 155 (PRE). Lion's River: Nottingham Road, *Galpin* 10269 (PRE). Pietermaritzburg: Swartkop, *Wood* 11757 (BOL, G, PRE, SAM), *Wylie*, herb. *Wood* no. 10153 (K, BOL, Z; type of *G. subaphyllus*). Polela: about 10 km from Underberg station, *R. A. Dyer* 3259 (BOL, PRE, K). Richmond: Richmond, *Wheeler* (LD). Umzinto: Mtwalume (Umtwalumi), near Fairfield, *Rudatis* 122 (B); Fairfield, Dumisa, *Rudatis* 1194 (BM, BOL, G, K), 750 (BM, G, GRO, K, L, P, PRE, S, Z); Moyeni, Dumisa, *Rudatis* s.n. (BOL). Weenen: above Culvers, 104 km N. of Pietermaritzburg, *Rogers* 28151 (Z). Without precise locality: British Kaffraria, *Cooper* 458 (K, type of *G. pubescens* Bak.).

TRANSVAAL.—Pilgrim's Rest: mountain slopes above Graskop, *Lewis* 6173 (NBG), *Rogers* 14936 (GRA).

G. parvulus is distinguished from other species in the group, in which the basal leaf and flowering shoot are produced separately, by its pilose leaves and very small delicate regular or almost regular flowers. The latter closely resemble those of some species of *Ixia* and *Geissorhiza* and the species was actually placed in these two genera, *Tyson* no. 1872 being the type of both *Ixia brevifolia* Baker and *Geissorhiza gracilis* Baker. The species was first named *G. pubescens* by Baker in 1876 but in 1954 Lewis pointed out that this name had been used by Lamarck in 1791 for another *Gladiolus* and proposed the name *G. pubigerus* for Baker's. On comparing the type collection with *G. parvulus* Schltr. she found that it represented a form of that species and as Schlechter's is the oldest available name, it was retained.

In the typical form the plants are extremely slender, the stem more or less capillary, 2–4-flowered, and the very small bract-like upper leaf is situated just below the spike. In the Transvaal form the stem is slightly more sturdy and the second leaf is immediately above the lower and partly sheathed by it, with no visible internode, while the type of *G. pubescens* represents an intermediate form which links the other two together.

It is interesting to see how the linear leaf of the non-flowering plant becomes tubular when a spike develops.

Two collections at PRE, *Galpin* 10269 and *Trauseld* 671, from Natal may represent hybrids between *G. woodii* or possibly *G. longicollis* Bak. and *G. parvulus*. They are taller with more and shorter cauline bracts; the perianth is cream or yellow but its shape resembles that of the more primitive *G. parvulus* although the perianth lobes are more acuminate. Photos of *Trauseld* 671 are reproduced in his book, *Wild Flowers of the Natal Drakensberg* (1969) opposite p. 45 (incorrectly identified as *G. inandensis* Bak.).

Uncertain Species

Species described as coming from South Africa not certainly identified.

G. anorhanthus Ingram in Gard. Chron. ser. 3, **94** : 273 (1933); Type: *Ingram*, hort. (BM). Said to have come from Potgietersrus in the Transvaal. The material is poor and it would appear as if the flowers had not developed normally.

G. bakeri Dur. & Schinz, Consp. Fl. Afr. **5** : 213 (1893), nom. nov. for *G. micranthus* Bak., Handb. Irid. 212 (1892), non Bak. 1904, nec Stapf 1885. Type: Botswana, 'Bechuana Country' *Holub*. The type specimen could not be located. Apparently near *G. unguiculatus* Bak.

G. elatus Balb., Cat. Hort. Taurin. 38 (1813). Described from plants that had been growing in the open for thirty years and said to have been given to the Turin Garden by the King of Sardinia's Minister as 'a Gladiolus from the Cape of Good Hope'. Durand & Schinz quote it as a synonym of *G. involutus* Delaroche but from the brief description given by Balbis, his plants were almost certainly a tall form of a European species; and there is at Leiden a specimen named *G. elatus* Balb. which is certainly a European plant.

G. eulophioides Bol.f. in Ann. Bolus Herb. **2** : 99 (1917). Type: Cape, Caledon *Pappe* 461 (GRA, holo.). The species was described from an incomplete specimen collected in October 1852 by Pappe at Caledon but has not been matched by any plants collected in that area. It seems to be nearest *G. odoratus* Bol., which however does not occur in that district and flowers in winter.

G. inclusus Bol.f. in Ann. Bolus Herb. **2** : 102 (1917). Type: Transvaal, Pilgrim's Rest, *Rogers* 14311 (BOL, holo.). Material incomplete. Possibly *G. ecklonii* Lehm. with stunted flowers.

G. leichtlini Bak. in Gard. Chron. ser. 3, **6** : 154 (1889) Handbk. Irid. 214 (1892), Fl. Cap. **6** : 158 (1896). Type ex hort. Leichtlin (K, holo.). The type flowered with Max Leichtlin at Baden Baden in 1889 from corms said to have been collected by Adlam in the Transvaal in 1887. It could not be matched with material from South Africa. Specimens identified as this species in various herbaria were considered by Lewis to be *G. natalensis* (the form named *G. antholyzoides* by Baker). Since the plant came from a nursery the possibility of its being a hybrid cannot be ruled out.

G. patersoniae Bol.f. in J. Bot., Lond. **66** : 14. 1928. Type: Cape, Steytlerville, *Paterson* 17 (GRA, holo., PRE, photo., BOL, tracing). Described from two plants, one with a corm, collected by Mrs Paterson without precise locality in September 1910. On the type sheet the only two flowers have been dissected and laid out. There is no note on the colour of the flowers. The plants are unifoliate, 2-3-flowered, the flower very small with a short curved tube. The plants cannot be matched with any herbarium material and it seems better to place them here among the *Incertae* until further collections of this possibly distinct species have been made.

G. sagittifer Salisb. Prodr. 41 (1796). Possibly a form of *G. carneus* Delaroche. No type seen. Not cited by Ker or Baker.

Gladiolus strictiflorus L.Bol. in J. Bot., Lond. **69** : 15 (1931); non Del. 1813. Type: Orange Free State, *Reitz*, NBG 523/29 (BOL, holo.). The description is based on a plant which flowered at Kirstenbosch in February 1930. It cannot be matched satisfactorily with material in South African herbaria. It may represent a stunted form of *G. papilio* Hook. f. The name is invalid.

G. sulphureus de Graaf ex Molkenb. in Jaarboek Tuinbouw 39 (1850). cum ic. color. Hook. f. Curtis's bot. Mag. t.7791 (1901); non Jacq. (1789) nec Baker (1887).

Molkenboer stated that De Graaf's plant was a hybrid between *G. natalensis* and *G. oppositiflorus*. His name was not cited in the *Index Kewensis* and in 1887 Baker described a *Gladiolus* from Mount Kilimanjaro as *G. sulphureus*. In 1893 Max Leichtlin sent to Kew a specimen of a *Gladiolus* which he said had been raised from Cape seed 20 years before and which he had grown (and probably distributed) as *G. sulphureus*. A few years later Leichtlin sent corms to Kew which flowered there in the summer of 1900 and were described by Hooker in *Curtis's bot. Mag.* sub t.7791 (1901) as '*G. sulphureus* de Graaf ex Molkenb. non Baker'. Hooker stated that in his opinion Leichtlin's plants were the same as Molkenboer's plant and that as Leichtlin had raised them from Cape seed, Molkenboer must have been mistaken in thinking his plant was a hybrid. Furthermore Hooker, giving priority to Molkenboer's 1850 publication, excluded Baker's *G. sulphureus* (1887) as a later homonym and cited *G. adlami* Bak. (1889) as a synonym though he admitted that Adlam's plant differed in some respects.

G. sulphureus Jacq. had been transferred to *Babiana* by Ker in 1801 and, at the time when Hooker wrote, the epithet could legitimately be reused in *Gladiolus*. That is no longer so; and if Hooker's conclusions are to be accepted, *G. sulphureus* of Molkenboer (1850) and of Leichtlin ex Hooker (1901) fall into synonymy under *G. adlami* Bak. But from the incomplete and poor type specimens at Kew, ex the Cambridge Bot. Gdn., *G. adlami* seems to have been a small-flowered form referable to the *G. natalensis* complex and the name has been cited under that species (q.v.). Leichtlin's *G. sulphureus* is not the same; it cannot be matched with any material in South African herbaria and can hardly be included under *G. natalensis*, variable though that species is. It seems probable that Molkenboer's plant was, as he stated, a yellow 'Gandavensis' hybrid and that Leichtlin's plant was the same or a similar hybrid. But his claim that it had been raised 'from Cape seed' makes this uncertain. Hooker's statement that the 'species is a native of the Transvaal' refers to *G. adlami*. Leichtlin's 'Cape seed' may have come from anywhere in the summer-rainfall areas of South Africa.

Excluded Species

South African Species described as *Gladiolus* now referred to other genera.

Note. Where recent revisions could be consulted the names should be mostly correct but in genera such as *Watsonia*, *Tritonia* and a few others not studied taxonomically in recent times, the specific epithets cannot be relied upon.

Gladiolus aureus Bak. in Fl. Cap. **6** : 530 (1896); Lewis in Adamson & Salter, Fl. Cape Penins. 257 (1950); Marais in Curtis's bot. Mag. new series 175, 6.479 (1965). Type: Cape Peninsula, on lower mountain slopes at Kommetjie, *Fair* in BOL 7951 (BOL, holo., B, GRA, K, PRE, Z), = **Homoglossum aureum** (Bak.) Oberm., comb. nov.

Gladiolus abbreviatus Andr. = **Petamenes abbreviatus** (Andr.) N.E. Br.

aletroides Vahl = **Watsonia aletroides** (Burm. f.) Ker

alopecurioides L. = **Micranthus alopecurioides** (L.) Eckl.

alopecurioides sensu Pers. = **Therecianthus spicatus** (L.) Lewis

amabilis Salisb. = **Anomatheca verrucosa** (Vogel in Trew) Goldblatt

ambiguus Roem. & Schult. = **Babiana ambigua** (Roem. & Schult.) Lewis

amoenus Ehrh. ex Roem. & Schult. = **Tritonia flabellifolia** (Delaroche) Lewis

amoenus Salisb. = **Watsonia meriana** Mill.

anceps sensu Jacq. = **Lapeirousia jacquinii** N.E. Br.

anceps L.f. = **Lapeirousia anceps** (L.f.) Ker

angustifolius Lam. = **Babiana tubulosa** (Burm. f.) Ker var. **tubiflora** (L.f.) Lewis

angustifolius Regel = ? **Ixia** sp.

antholyza Poir. = **Anapalina nervosa** (Thunb.) Lewis

apiculatus Bol.f. = **Tritoniopsis apiculata** (Bol. f.) Lewis

arenarius Bak. = **Tritoniopsis unguicularis** (Lam.) Lewis, pro parte et **T. parviflora** (Jacq.) Lewis, pro parte

aristatus Schrank = prob. **Ixia** sp.

atrorubens N.E. Br. = **Tritonia atrorubens** (N.E. Br.) L. Bol.

bicolor Thunb. = **Synnotia villosa** (Burm. f.) N.E. Br.

bracteatus Thunb. = **Lapeirousia fissifolia** (Jacq.) Ker

bracteolatus Lam. = **Therecianthus bracteolatus** (Lam.) Lewis

burmannii Schrank = prob. **Ixia scillaris** L.

capitatus L. = **Aristea** sp.

cardinalis Red. ex Steud. = **Tritonia crocata** (L.) Ker

coccineus Schrank = **Ixia campanulata** Houtt.

corymbosus Burm. f. = **Freesia corymbosa** (Burm. f.) N.E. Br.

costatus Eckl. (nom. nud.) = **Engysiphon** sp.

crispus sensu L.f. = **Tritonia lacerata** (Burm. f.) Klatt

- Gladiolus cristatus* Trew = **Tritonia securigera** (Ait.) Ker
crocatus Pers. = **Tritonia crocata** (L.) Ker
cunonia Gaert. = **Anomalesia cunonia** (L.) N.E. Br.
denticulatus Lam. = **Lapeirousia fabricii** (Delaroche) Ker
dichotomus Thunb. = **Romulea dichotoma** (Thunb.) Bak.
discolor Schrank = ? **Hesperantha** sp.
elongatus Salisb. = **Babiana tubulosa** (Burm. f.) Ker var. **tubiflora** (L.f.) Lewis
excisus Jacq. = **Anomatheca verrucosa** (Vogel ex Trew) Goldblatt
exscapus Thunb. = **Engysiphon exscapus** (Thunb.) Lewis
fabricii (Delaroche) Thunb. = **Lapeirousia fabricii** (Delaroche) Ker
falcatus L.f. = **Lapeirousia falcata** (L.f.) Ker
fissifolius Jacq. = **Lapeirousia fissifolia** (Jacq.) Ker
fistulosus Jacq. = **Micranthus tubulosus** (Burm. f.) N.E. Br.
flavus Ait. = **Tritonia flava** (Ait.) Ker
flexuosus L.f. = **Tritoniopsis flexuosa** (L.f.) Lewis
florentiae Marloth = **Montbretiopsis florentiae** (Marl.) L.Bol.
formosus Pers. = **Babiana striata** (Jacq.) Lewis
fragrans Jacq. = **Babiana plicata** Ker
fraternus N.E. Br. = **Tritoniopsis unguicularis** (Lam.) Lewis
galeatus Jacq. = **Synnotia galeata** Sw.
gawleri Klatt = **Homoglossum gawleri** (Bak.) N.E. Br.
glumaceus Thunb. = **Watsonia marginata** (L.f.) Ker
gramineus L.f. = **Melasphaerula ramosa** (Burm. f.) N.E. Br.
inclinatus DC = **Babiana tubulosa** (Burm. f.) Ker var. **tubiflora** (L.f.) Lewis
inconspicuus Bak. = **Hesperantha baurii** Bak.
infundibuliformis Schrank = **Watsonia** sp.
iridifolius Jacq. = **Watsonia meriana** Mill.
ixioides Thunb. = **Ixia paniculata** Delaroche
jacquinii Schrank = ? **Watsonia** sp.
juncus Burm. f. = **Geissorhiza aspera** Goldblatt
juncus L.f. = **Anomatheca verrucosa** (Vogel in Trew) Goldblatt
laccatus Jacq. = **Watsonia humilis** Mill.
laceratus Burm. f. = **Tritonia lacerata** (Burm. f.) Klatt
lacerus Panzer = **Tritonia lacerata** (Burm. f.) Klatt
latifolius Lam. = **Babiana villosa** (Ait.) Ker
laxus Thunb. = **Anomatheca laxa** (Thunb.) Goldblatt
lineatus Salisb. = **Tritonia lineata** (Salisb.) Ker
longiflorus Andr. = **Babiana tubulosa** (Burm. f.) Ker
longiflorus sensu Bak. = **Engysiphon exscapus** (Thunb.) Lewis
longiflorus sensu Jacq. et var. = **Ixia paniculata** Delaroche
longiflorus L.f. = **Tritonia longituba** Foster

- Gladiolus lucidor* Bak. = **Anapalina triticea** (Burm. f.) N.E. Br.
luteus Schrank, nom. nud. = **Ixia curta** Andr.
marginatus L.f. = **Watsonia marginata** (L.f.) Ker
marmoratus Lam. = **Watsonia** sp. cf. **W. brevifolia** Ker
merianus Jacq. = **Watsonia meriana** Mill.
merianellus Thunb. = **Homoglossum merianellum** (L.) Bak.
minutiflorus Schrank = **Micranthus alepecurioides** (L.) Rothm.
mollis Vahl = **Anaclanthe plicata** (L.f.) N.E. Br.
montanus L.f. = **Tritoniopsis parviflora** (Jacq.) Lewis
montanus Thunb. = prob. **Tritoniopsis unguicularis** (Lam.) Lewis
mucronatus DC = **Babiana villosa** (Ait.) Ker
mucronatus Jacq. = **Babiana mucronata** (Jacq.) Ker
mucronatus Lam. = **Babiana ambigua** (Roem. & Schult.) Lewis
nanus Andr. = **Babiana nana** (Andr.) Spreng.
nemorosus N.E. Br. = **Tritoniopsis nemorosa** (E. Mey. ex Klatt)
 Lewis
nervosus Bak. = **Anapalina nervosa** (Thunb.) Lewis
nervosus Lam. = **Babiana stricta** (Ait.) Ker
odorus Schrank = **Sparaxis fragrans** (Jacq.) Ker
paleaceus Vahl = **Babiana spathacea** (L.f.) Ker
paniculatus Pers. = **Anomatheca verrucosa** (Vogel in Trew)
 Goldblatt
papilionaceus Salisb. = **Anomalesia cunonia** (L.) N.E. Br.
parviflorus Jacq. = **Tritoniopsis parviflora** (Jacq.) Lewis
parviflorus Vahl = ? *G. spicatus* = **Watsonia lamarckii** A. Dietr.
 (Possibly *Labiatae*?)
pectinatus herb. Banks ex Ker = **Tritonia lacerata** (Burm. f.) Klatt
pendulus Mund ex Eckl. = **Dierama pendulum** (L.f.) Bak.
plantagineus Pers. = **Micranthus alepecurioides** (L.) Eckl.
plicatus Ait. = **Babiana stricta** (Ait.) Ker
plicatus Andr. = **Babiana stricta** (Ait.) Ker var. **sulphurea** (Jacq.)
 Bak.
plicatus Jacq. = **Babiana plicata** Ker
plicatus angustifolius Jacq. = **Babiana lineolata** Klatt
plicatus Lam. = **Babiana tubulosa** (Burm. f.) Ker var. **tubiflora**
 (L.f.) Lewis
plicatus L. = **B. villosula** (Gmel.) Ker ex Steud.
plicatus Thunb. = **Babiana plicata** (Thunb.) Ker
polystachyus Andr. = **Anomatheca verrucosa** (Vogel in Trew)
 Goldblatt
pottsii McNab ex Bak. = **Crocasmia pottsii** (Bak.) N.E. Br.
praecox Andr. = **Homoglossum watsonium** (Thunb.) N.E. Br.
pubescens Lam. = **Babiana pubescens** (Lam.) Lewis

Gladiolus pulchellus Salisb. = **Anomatheca verrucosa** (Vogel in Trew)
Goldblatt

punctatus Roem. & Schult. = **Thereianthus bracteolatus** (Lam.)
Lewis

puniceus Vahl = **Babiana villosa** (Ait.) Ker

pygmaeus Roem. & Schult. = **Babiana pygmaea** (Burm. f.) N.E. Br.

pyramidalis Burm. f. = **Ixia patens** Ait.

pyramidalis Lam. = **Watsonia pyramidata** (Andr.) Stapf

pyramidatus Andr. = **Watsonia pyramidata** (Andr.) Stapf

ramosus L. = **Melasphaerula ramosa** (Burm. f.) N.E. Br.

ramosus N.E. Br. = **Tritoniopsis ramosa** (Eckl. ex Klatt) Lewis

recurvatus Bak. = **Hesperantha radiata** (Jacq.) Ker

recurvus Houtt. = **Homoglossum acuminatum** (N.E. Br.) N.E. Br.

recurvus Thunb. = **Hesperantha radiata** (Jacq.) Ker

reflexus Lichtst. ex Roem. & Schult. = **Babiana** sp.

refractus Jacq. = **Freesia refracta** (Jacq.) Klatt

resupinatus Pers. = **Freesia refracta** (Jacq.) Klatt

ringens Thunb. = **Babiana stricta** (Ait.) Ker

roseo-albus Jacq. = **Watsonia roseo-alba** (Jacq.) Bak.

roseus Jacq. = **Tritonia flabellifolia** (Delaroche) Lewis

roseus Willd. = **Tritonia flabellifolia** (Delaroche) Lewis

rubens Vahl = **Thereianthus spicatus** (L.) Lewis

rubrocyaneus Vahl = **Babiana rubrocyanea** (Jacq.) Ker

sambucinus Jacq. = **Babiana sambucina** (Jacq.) Ker

secundus Thunb. = **Babiana secunda** (Thunb.) Ker

securiger Ait. = **Tritonia securigera** (Ait.) Ker

setifolius L.f. = **Lapeirousia divaricata** Bak.

silenoides Jacq. = **Lapeirousia silenoides** (Jacq.) Ker

sparrmannii Thunb. = **Freesia sparrmannii** (Thunb.) N.E. Br.

spathaceus L.f. = **Babiana spathacea** (L.f.) Ker

spicatus Lam. = rejected sp. (P, holo., incomplete. Not an *Iridaceae*
according to Lewis).

spicatus L. = **Thereianthus spicatus** (L.) Lewis

splendens Herb. = **Anomalesia splendens** (Sw.) N.E. Br.

sprengelianus Schult. = **Watsonia strictiflora** Ker

stenophyllus Schrank = **Babiana lineolata** Klatt pro parte

stoloniferus Salisb. = **Chasmanthe aethiopica** (L.) N.E. Br.

striatus Jacq. = **Babiana striata** (Jacq.) Lewis

striatus Roem. & Schult. = **Tritonia bakeri** Klatt

striatus Soland. ex Bak. = **Tritonia bakeri** Klatt

strictiflorus Delaroche f. = **Watsonia humilis** Mill.

strictus Ait. = **Babiana stricta** (Ait.) Ker

strictus Lam. = **Babiana lineolata** Klatt

subulatus Vahl = **Thereianthus bracteolatus** (Lam.) Lewis

- Gladiolus sulcatus* Lam. = **Antholyza plicata** L.f.
sulphureus Jacq. = **Babiana stricta** (Ait.) Ker var. **sulphurea** (Jacq.) Bak.
tabularis Pers. = **Tritoniopsis unguicularis** (Lam.) Lewis pro parte et **T. parviflora** (Jacq.) Lewis pro parte
testaceus Vahl = **Watsonia brevifolia** Ker
thunbergii F. G. Dietr. = **Engysiphon exscapus** (Thunb.) Lewis
triticeus Thunb. = **Thereianthus bracteolatus** (Lam.) Lewis
tubatus Jacq. et var. = **Babiana tubulosa** (Burm. f.) Ker
tubiflorus L.f. = **Babiana tubulosa** (Burm. f.) Ker var. **tubiflora** (L.f.) Lewis
tubulosus Burm. f. = **Micranthus tubulosus** (Burm. f.) N.E. Br.
tubulosus Jacq. = **Watsonia aletroides** (Burm. f.) Ker
umbellatus Schrank = **Ixia dubia** Vent.
venosus Willd. = **Tritonia lineata** (Salisb.) Ker
villosulus Gmel. ex Roem. & Schult. = **Babiana villosula** (Gmel.) Ker ex Steud.
villosus Burm. f. = **Synnotia villosa** (Burm. f.) N.E. Br.
viridis Ait. = **Anomatheca viridus** (Ait.) Goldblatt
watsonius Thunb. = **Homoglossum watsonium** (Thunb.) N.E. Br.
xanthospilus DC = **Freesia xanthospila** Klatt

On Hybrids and Hybridization

T. T. BARNARD

In this Revision 103 species have been described with 14 subspecies and 24 varieties. A few of these taxa are known only from one small area, others are widespread—growing in isolated populations, flowering at different times and varying in size or scent. These variations, although not taxonomically significant, render the ecotypes within such species culturally distinct. It would be possible to collect 20–30 different forms of some of the more variable species and if any botanic garden or individual attempted to make a representative collection of the South African Gladioli, this might well entail the cultivation of over one thousand forms divided between the two groups—the summer-flowering and the winter-growing species from the Cape.

Many of the species have been introduced into cultivation in Europe at different times over the last 250 years, but few of them have been maintained in cultivation for any length of time. The great contribution that the genus has made to world horticulture has been through the hybrids of a few summer-flowering species and three or four of the Cape winter growers, mainly from crosses originally made more than 100 years ago. The fascination of raising new colour forms and the ever-increasing demand for cut-flowers have combined to make the growing of these hybrids into the mammoth industry it is today. Other hybrids have been raised in cultivation whether accidentally or deliberately—not only within the genus but also with species of the closely related genera, *Homoglossum*, *Anomalesia* and the tropical *Acidanthera*. In most cases these hybrids have proved fertile and it is possible to raise plants that have five or six species in their immediate ancestry. The scope for further hybridization within the group seems limitless. Nevertheless there are some limiting factors.

The Cape winter-growing species are, as far as is known, all diploids with a chromosome number of $2n = 30$. The summer-flowering species are also probably mainly diploids but many polyploids have been recorded. The various forms of *G. natalensis* are mainly tetraploids; though diploid populations are known and some have higher polyploidy—pentaploids such as the cultivar 'Hookeri', and hexaploids. Crossing species with different chromosome numbers is not necessarily impossible but the number of viable seeds is likely to be small and the resulting progeny often sterile. Moreover, there is some evidence of interspecific incompatibility between species with the same chromosome number which results again in reduced seed production and sterile progeny. Nevertheless the scope for further hybridization in the group is very wide and is certain to be attempted by professional growers as well as amateurs. Whether such attempts will be aesthetically or commercially worth while is problematic. A brief summary of the history of the modern hybrids will best explain the present situation and allow of suggestions for future developments.

William Herbert (1778–1847), later Dean of Manchester, raised the first

recorded hybrids between some of the Cape species of *Gladiolus* and published reports on his experiments in the Transactions of the Horticultural Society (Herbert. 1820 & 1822 *a* & *b*). The species concerned were *G. cardinalis*, *G. tristis*, *G. carneus*, *G. angustus*, *G. caryophyllaceus*, *G. carinatus*, *G. liliaceus*, etc. He was then living at Spofforth in Yorkshire where he had a well-sheltered garden 'on a light yellow loam suitable for barley'. He found that the hybrids between the late spring and summer species—*G. cardinalis*, *G. tristis*, *G. carneus* and *G. angustus*—could be grown permanently in the open there, where they 'flowered every June among the roses'. In 1837 he was able to report that he had clumps that had stood outside for upwards of 20 years with only the protection of a covering of leaves from November to March. The *carinatus* and *caryophyllaceus* hybrids were more tender and had to be grown under glass.

Soon after the publication of Herbert's first papers on his *Gladiolus* hybrids, his example was followed by some of the nurserymen who specialized in Cape bulbs. In 1823 Colville's of Chelsea flowered a hybrid from *G. tristis*, pollinated by *G. cardinalis* which he put on the market and which was illustrated by Sweet (1826) under the name of *G. colvillei*. Hybrids between these two species and *G. carneus* were raised by other growers. In 1835 at the sale of Colville's nursery, Messrs Lucombe and Prince purchased the stock of a new hybrid between *G. carneus* and *G. cardinalis* which they named *G. insignis*—a much more richly coloured plant than the earlier hybrids of the *Colvillei* type. This group of winter-growing early flowering hybrids have continued to be cultivated with fluctuating popularity; new varieties have been produced from time to time and with the recent increased interest in smaller flowered forms, the Colvillei and Nanus hybrids, as they are called, are being further extended by crossings with other forms and other species.

When the early Colvillei hybrids were being established as popular spring cut-flowers, the cultivation of South African *Gladioli* in Europe was revolutionized by the introduction of two tall summer-flowering species.

Gladiolus oppositiflorus is believed to have been first collected by John Forbes, who had been commissioned by the London Horticultural Society to accompany Captain Wood on a survey of the coast between Port Elizabeth and Delagoa Bay in 1822. It was not named by Herbert until 1837 and its early history is obscure. It was wrongly thought to have come from Madagascar and had apparently been grown in Europe since 1823 under the erroneous but rather apposite epithet of *G. floribundus*, for at that time the true *G. floribundus* of Jacquin was almost universally known as *G. undulatus*. In the early 1830s a hybrid was raised in Holland and distributed as '*G. ramosus*'. The actual parentage is unknown. Its cultural requirements indicate that it was a hybrid between a summer- and a winter-growing species and it is generally considered to have been a cross between *G. oppositiflorus* and a *G. cardinalis* × *G. carneus* hybrid.

Gladiolus natalensis was imported into Europe in 1827 from the environs of Port Natal. Being a form that produces masses of small cormlets and also divides annually into 2–4 mother corms it was soon widely distributed. The

first hybrids of *G. natalensis* were raised by M. Bedinghaus, gardener to the Duc d'Arenberg at Enghien about 1837. Some of these were sold to Messrs Van Houtte of Ghent who put them on the market as the 'gandavensis' hybrids. It was claimed that they were hybrids between *G. natalensis* and *G. cardinalis*. But the early illustrations show no sign of *G. cardinalis*; therefore Dean Herbert and later commentators are undoubtedly correct in believing that the other parent was *G. oppositiflorus*.

During the next thirty years hundreds of new cultivars differing in colour, markings and size of flower were raised in Europe—most notably perhaps by Souchet, gardener to Napoleon III at Fontainebleau. They were all derived from the original 'gandavensis' cross and from the *G. 'ramosus'* hybrid which was used by some breeders.

By 1870 a number of other summer-flowering species had been introduced to Europe. Lemoine of Nancy acquired corms of *G. papilio* and its colour form *purpureo-auratus*. He found that they were hardy and increased readily by stolons if left permanently in the open border. He attempted to cross them with the 'gandavensis' hybrids. *G. papilio* is now known to be a pentaploid with 75 chromosomes and Lemoine only succeeded at first in raising three seedlings. Two of these proved as hardy as *G. papilio* and produced fertile seed when crossed back to the *gandavensis* hybrids. In this way he established a new race with the dark blotches on the lower segments characteristic of *G. papilio*. Neither the trade nor the general public seem to have been interested in the hardness of the first crosses; and the blotched 'Lemoinei hybrids' were developed as a group to be treated like the other summer-flowering cultivars and their potential hardness forgotten. Other forms of *Gladiolus natalensis* were introduced and the dark maroon and green forms (= *G. dracocephalus*) which Cooper collected for Saunders of Reigate were of some temporary interest to hybridists. Of more importance were the two red-flowered species, *G. cruentus* and *G. saundersii*, both of which were extensively used by hybridists. *G. saundersii* was used by Max Leichtlin to produce a race of hybrids that were later to be developed by Childs of New York as '*G. childsii*' for the American market. In Europe the *saundersii* hybrids, when crossed with the earlier *Lemoinei* hybrids, gave rise to another race that Lemoine named *G. nançéianus*. These distinct 'races' have gradually been merged into the modern large-flowered or 'grandiflora' class, divided for exhibition purposes into sections based on flower-size and colour, and the constant production of new seedlings results in the older varieties disappearing from the commercial catalogues and hence from general cultivation within five to ten years of their introduction.

In 1902 the slender yellow-flowered form of *G. natalensis* from the Victoria Falls was introduced to Europe under the name of *G. primulinus* and provided hybridists with an entirely new race of smaller flowered cultivars in yellows and reds and various pastel shades. As developed by Thorburn in America, Cayeux and Le Clerc in France and by Kelways and Unwins in England, the 'primulinus' hybrids quickly obtained wide popularity. They were almost lost

to cultivation during the last war, but have been revived in great variety and today form an important section of *Gladiolus* cultivars, kept distinct from the large-flowered varieties by recognized standards of size and flower form.

Recently there has been an increased demand for smaller cultivars and for earlier flowering to fill the gap between the *Colvillei-nanus* group and the large late summer flowerers. This has been met to some extent by the Miniatures, the Butterflies with their contrasting blotches and the new race of Peacock *Gladioli*; and by renewed interest in the *Colvillei-nanus* group. It is apparent that the modern hybridists have a sufficient 'gene pool' available for the production of new forms and new colour combinations *ad infinitum*, and most growers may feel that the species have little to offer that would justify the trouble and time inevitably required to introduce new factors into the existing varieties. Nevertheless there are certain possible objectives that may be worth mentioning.

It has been suggested that some of the species and particularly some of the ecotypes of *G. natalensis* may be resistant to one or more of the diseases that affect the cultivated hybrids. This is specialized research for a scientific institution and should yield results of interest, even though it will be difficult to transfer resistance to any group of hybrids without loss of quality.

A feature of the South African species is the time factor which controls their dates of flowering. This is constant for each local population and is little affected by climatic conditions. A species may be said to have a flowering season extending over several months. Such a statement really implies that there are several ecotypes which regularly flower every year in different localities at different times. The many different forms included in this Revision under *G. carneus* flower from August to January, each isolated population flowering for two to three weeks on approximately the same dates every year. Among the summer-growing species, the forms of *G. natalensis* may be found in flower in their different localities from October to May. The flowering times of the different ecotypes are not only constant in the wild from year to year but remain relatively constant in cultivation and when plants have adapted themselves to the seasons in the Northern Hemisphere they continue to flower earlier or later according to their inherited timing. Hybrids between plants with different flowering seasons may approximate to one or other parent but are usually intermediate. For the successful cultivation of any species or hybrids it is important to understand the annual growth cycle and flowering time and regulate their culture accordingly, and in any hybridizing project it may be essential to obtain the very early or the very late flowering forms in order to achieve the desired result. The forms of both *G. natalensis* and *G. oppositiflorus*, from which the original 'gandavensis' hybrids were raised, flower in South Africa about midsummer. If the first importations had been the late March-flowering form of subspecies *salmonaeus* and the even later May-flowering forms of *G. natalensis*, it would have been impossible to raise hybrids that would have flowered in Europe in the open ground before the autumn frosts. Dean Herbert's

success in raising hybrids that flowered in the open in late spring was only made possible because he was using the late-flowering Cape species and ecotypes. The early flowering forms of *G. natalensis*, the form described by Baker as *G. antholyzoides*, for example, might be used to produce a race of garden hybrids that in the Northern Hemisphere would, from a March planting, produce flowers in late May or June; and hybrids of the lovely precocious-flowering *G. aurantiacus* should flower even earlier. In the Cape there is one or more species that can be found in flower every week throughout the year. Anyone who wished to raise a race of 'Cape' hybrids to flower at a particular time of year—whether midsummer or midwinter, autumn or spring—could use as his foundation stock the species and ecotypes that flower naturally at the required season.

The Colvillei-nanus hybrids can be used as they were by Dean Herbert for permanent planting in the open in England and Western Europe provided healthy stock is obtained and a well-drained sheltered site chosen. A few summer-flowering species that grow naturally in marshes or by stream-sides are surprisingly persistent in gardens in southern and western England. They have the advantage of being winter-dormant so that they avoid leaf damage by frost and snow. *Gladiolus papilio* and its colour forms are all marsh plants, which grow and increase readily when left in the open ground in English gardens. The typical form is perhaps not particularly attractive and, being rather invasive, may come to be regarded as a weed. However, remembering Lemoine's success in raising hardy hybrids a hundred years ago, one wonders whether there would not be some demand for brighter coloured hardy summer-growing hybrids that would form permanent clumps and flower annually in the open border as *Crocospia* (*Curtonus*) *paniculatas* and *C. masonorum* do. The project may not commend itself to commercial growers, but should anyone wish to try, seed or corms of the brighter coloured forms should be obtained. Some of the ecotypes of *G. natalensis* might also be used for this purpose.

There has been considerable controversy for a number of years about the desirability of introducing scent into the large-flowered hybrids. The majority of breeders seem to have concluded that scent was unnecessary and even undesirable. But some enthusiasts have been trying for many years, using with little or no success the scented winter-growing species from the Cape. Then a few cultivars were raised in America with a faint but definite scent apparently quite unconnected with any of the Cape species. Now an entirely new approach has been made available by Mrs Joan Wright in New Zealand who succeeded in raising fertile hybrids between the Gladiolus cultivar 'Filigree' and *Acidanthera bicolor*. Her selected hybrid 'Lucky Star' has been widely distributed and thousands, if not millions, of seedlings have been raised from it—either as pollen or seed parent—and especially when used with the American scented cultivars such as 'Acacia', a number of scented plants have been bred. The scent will no doubt vary and certain undesirable *Acidanthera* features will be bred out and those who want a scented 'grandiflora' Gladiolus will soon have a wide choice.

The varying scents of the Cape species are fascinating to anyone who is scent conscious. Although it may now be unnecessary to attempt to introduce these scents into the large summer-flowering cultivars, there is no reason why scent should not be introduced into the still popular *Colvillei-nanus* group and possibly into the Miniatures and Butterflies. Special mention may be made in this connection of Captain Collingwood Ingram's 'Homo-glad' hybrids. They were originally raised from a very late (October) form of *Homoglossum watsonium* and *Gladiolus tristis*. They have proved hardy in his garden in Kent where they have grown and sown themselves these last forty years. They are very variable in colour; many of them are strongly scented and they are extremely fertile. Thus they can be crossed readily with other species and the resulting seedlings usually continue highly fertile. They are rather thin in texture perhaps, but they make excellent cut-flowers and would repay selection and improvement. They are also a possible source of scent when crossed with the *Colvillei-nanus* hybrids.

For nearly forty years I have grown many of the Cape species under glass at Furzebrook in Dorset and during this time I have raised a large number of hybrids. The value of any species or hybrid is to me greatly enhanced if the flower-spikes can be used as cut-flowers, combining scent with stem-length, colour and a pleasing flower shape. Such of the hybrids as conformed to these requirements were selected, named and exhibited. *Gladiolus* × *Christabel*, which combines the strong all-day scent of the dwarf *G. virescens* with a stem-length derived from *G. tristis* has proved, over the last twenty years, to be the most popular and successful. Several other selected hybrids have combined to form a group of delicate, scented early spring flowers suitable for small bouquets. Whatever may be the commercial possibilities of such a group—either in South Africa or for cool greenhouses in colder climates—these hybrids are not the only contribution the Cape species might make to horticulture. They can be used for introducing new scents and colours into Ingram's 'Homo-glads' and into the unscented *Colvillei-nanus* hybrids; and probably into the Miniatures and Butterflies derived from the summer-growing species.

It is hoped that this Revision of the South African species will encourage the cultivation whether by botanic gardens, commercial growers or amateurs of many of the beautiful species described here. The establishment in South Africa of regional gardens, each devoted to the study of the local flora, should lead to the availability of seed of many species hitherto unobtainable. Seed is undoubtedly the most satisfactory—and indeed the only justifiable—method of introducing the species to cultivation; nor is it a dauntingly lengthy method, since most will flower within three years. It should be the function of botanic gardens to collect and grow the species and their various forms. Only plants that are easy to cultivate and have sufficient popular appeal are likely to be maintained in cultivation by commercial growers or amateurs, and there are very few species of *Gladiolus* able to compete in these respects with the numerous hybrids already available. There will be gardeners both in South Africa and

overseas interested in growing more of the species and in testing their horticultural value; and inevitably some growers will wish to experiment in raising hybrids with possibly increased vigour, new flower forms, new colours or new scents. The objectives suggested are only suggestions and do not by any means exhaust the possible contribution that further hybridization might still make towards the production of new and worth-while garden plants—semper aliquid novi Africa affert!

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Dr G. Joyce Lewis, who at the time of her sudden death in 1967 was Botanical Research Officer at the Compton Herbarium, Kirstenbosch, had not completed her work on the genus *Gladiolus* on which she had been working for several years. She was the acknowledged authority on South African Iridaceae and her revision of the South African species of *Gladiolus* was eagerly awaited.

Fortunately Mrs Mauve (A. Amelia Obermeyer), Research Officer of the Botanical Research Institute, Pretoria, was willing to undertake the mammoth task of reviewing, bringing up to date and completing the work; and it is due to her that this fine book has been completed.

T. T. Barnard, who first became interested in South African Iridaceae when he was Professor of Social Anthropology at the University of Cape Town, 1926-33, has for over thirty years grown many of the Cape species in England. His co-operation in this work has been of great value to both authors.

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